Oceanography

410) Boundary favor out exchange processes SEATONIAL VARIATIONS IN THE TPLEE ARCTIC SCEAN AS GESERVED AT T-) AN OBSERVED AT T-1
James Moriaco | Paler Delence Canler, University
of Veshington, Coll Posseveit Mer Mr. Seartie,
MA 98193) and f. Dungan delth, Geophysics Program,
University of Mashington, Seattle, Ma.
Hiddengraphic date from T-1 are analyzed to
tileastates the behavior of the Arctic mixed layer,
The stread layer depth fluctuates in a symully
and alred layer salinity fluctuates 0.32 m/co.
The lineasticus in total sali content age condistent with theoretical week by Maybut and
are in phase with stard layer depth, indicating
riagon in the sized layer are convenied by
sali flux. Designing of the mixed layer brings
0.1 deat em² yr⁻¹ of deat to the surface from
eta news beick. Goophys, Mes. Lett., Paper 110793

4710 Chemical oceanography
CALCULATING THE OCEANIC CO. INCREASE: A REED
FOR CALTIGN
Alas M. Shifiat (Scrippe Institution of Oceanography, University of California, San Olego, to
dolls, California 92093)
A number of worders have pressured to locations
eitempiling in show the asthropogenic CO, increase
in the ocean. These workers bath-calculation the
CO, concretitation of a water percel to when it
was at the sea curface by using well-snown relice
to correct for chamical aheagen Induced by blological decomposition. Sectors of the potential
significance of these EC, beat-calculations
into the sea curface by using well-snown relice
to to react for chamical aheagen Induced by blological decomposition. Because of the potential
significance of these EC, beat-calculations
rodels, risting is seen in ignificantly aller
cremical concentrations. However, previously
used mixing corrections are shown to have lifting
offs: on an area oppose the scription of prefurnal attrace. Additionally, the results of
the Capital College of the provide religible astimation
for the water mais to quasition. This she ability
of thece methods to provide religible astimation of
the capit CO, increase is in doubt. (farbous
dinates theyers, assure it intermediate water). J. de. phys. Cas., Groom, Paper 100999

4711 Cleculation
CINCLEFFOR OF THE CARIBBEAN BEAN A MELL-RE2014TH devised Problem
Dean Pushments NHOods Note Occanographic inetitulton, Nocie hals NN 02941, U.C.A.!
The Caribbean See is exhected as a rangion whose
the issays seeds circulation is well determined
by historical hydrographic measurements through
activation of the Immanuments. the image scale circulation is well determined by historized hydrographic menurosents through application of the leavers method. A single acceptable is used to illustrate the inchmique and to descript able how more physically salvent quantizes new per sail determined in the formally underdataration inverse problem. The questionist file field in the Caribbean is found by imposing mass and sair conservation constant polanicates and sair conservation constant polanicates apparated by derfence of constant polanicated descripts. An assistant descript is also played which fair seah dependence on as initial shorter of reference level. In addition, which to be a 7-4, the total lines instanting beautiful and the constant polanicated and the first beautiful and the constant polanicated to be a 12-4 to any in appreciate with direct by the salventers. This like is uniform the direct by the salventers.

the east and llowing across the southern half of the basis as the Cattibean Currest, and 7 viot as sec" entering from the north through Mindward Passage. Both of these tutrents show small scale watchill ity that disinishes with distance from the respective passages. The deep flow has no set transport, as required by the shallow axit, but a vet crystiand clockwise racticulation is lound in the deep eastern Caribbean. [Caribbean Ses, invarse mathod, general circulation].

J. Ogophys, Res., Green, Paper 100850

AND See ice
BLA ICE DISPLACEMENT PAON SEARAT SYNTHETIE
APPERUNE RABAN
R. E. Emil (Foier Beisere Center, University of
Venhingen, 4027 Bonseveit Vay NI, descrie, MA
SSIOL) and D. A. Rathtoch
images obtained by a symbetic aperture tadar on
SEARAT have been used to measure see ice displacements over a three day interval in Occober 1910,
The position of a natural ice Lesture was memmed
on 3 October and again on 8 October; ehe difference in these two positions is a displacement.
The displacement of many lestures was measured.
The tracked features ite coughly stong a line and
ate quite deces-about 2 has apert—over a distance oi 865 hm. The Simplacement arrors grow with
dispeters from shore becoming as large as 3 ho.
The grayh of displacement varies dispenses has
occasional discostinuities of several Silometers.
Oisplacement discontinuities are accurate to
i Q.Ol Sm sing track and 32 of their magnitude
actions track, (1928,877)
I. Geophys. Son., Greon, Paper 10094a

4765 Surface weves, tides and see level STATISTICAL ANALYSIS OF THE TSURAMIS OF THE STALLAN COAGT

THE TRAILER COACT
Michele Capute Itslitute of Fisica "G. Mar
Canl", Usivacaità degli Studi, Rose, ttely
and Gtasfrasco Paita.
The study of a catelogus of taumala of
the Itslian casets allows to assign the intessity to 10 6 tousemis of the catelogue
which are listed eccardingly. The statistic
al analysis the data of this list alsoe the
year 1000 suggests the tentative density
distribution

where s is the number of tawamia of inten-sity I per thousand years. IStatistics, tawamia ifalias coasts). J. Osophys, has, Grann, Paper tc1046

ATGS Surince waves, tides, and same tavel
MEASUSPHENTS OF THE EQUILIBITIES RANGE IN OCCAR
WAYL agaSTRA
George 7. Futefacati ISball Devalopment.
Company, 7. O. Rod 401. Hyuston, Taxas 7700t)
Wavesfaff measurements and in the Guif of
Maxico and Varacties measurements from the
Battleors Cuppes came have hear used to simely the
form of the equifibries came have hear used to simely the
form of the equifibries came have hear used to samely the
form of the equifibries came of occass wave specities. The samings showed that the spectral range
hatteness the same wave fragment in constituting to the
provinces in the propries of the feet again to the investion of the feet the came of the feet the came of the feet the came of the feet that again the feet the came of the feet the came of

mose period are known, the empifyeds of the tail of the spectrum ten be predicted with semawhat greater accuracy. Encover, this telecionably should be used with caution whee the height and period statistics ato influenced by swell. J. Capphys. Rus., Grans, dapor 100848

ical Saisness, 20 Oxford Street, Cambildgs, AA (21186)

Hear-field semant formation is detailed in this paper using polet memont tensor sources with a spherically symmetric, self-gravitating and sinatic Earth. Snapshots of vartical ass sutfats mation televalents withis 200 km and 100 seconds of an event typically show an initial tennant pulse slowly grow mad thus avoive into dispersed wave trains. The direction of first motion, the time and the imput scales of the developing pulse contradict static occapts which same tenomal formation on parmanent deformations of an otherwise tigid sus floor supporting is computable water. The parmanent errain lisid at the sea floor is, in fact, ittelevant because it is detined by frequencies with bloow the same of temperature by frequencies with bloow the same of temperature of sources, such as serthquakes, whose motions are deeply cooted in electric theory. The general point moment encour weed hate produces Iroquancy dependent temant redistion patterns of asimuchal degree 52. Pure dip and attike slip sources, however, create verse that see symmetric or anti-symmetric shout the spircents. active bit sources, nowwer, creat when the epi-center. Buried 10 km, with a means of 10⁴ km, these sources generate initial termest pulses 40 km wide. Markhum emplitudes of 156 and 45 cm octur 10 km from the spicenter, 60 s after the dislocation. Turnatis from deaper earthquakes are smaller, broader, and slover to develop be-deuse they are depicted of bigh frequencies. J. Osophya. Ras., Red, Faper 180840

A790 isstrucents and lachniques.
SEASAT SUTNETER MIGHT CALIFRATION
R. Koienklawicz (Mational Agronautics and Space Administratios, Coddard Space Illight Center: Greenbeit, MD 2777] C.T. Harlin
The Cennet altimater has been calibrated for height blas using four over171ght pages of Octavida which were supported by the Octavida Laper. The altimater data was corrocted for itidam, asing recorded, ride gage data; propagation of facts, using meteorological date takes around in time of each page; atosisation influence around in time of each page; atosisation influence and instrumental affects. Altimater data for such of the four pages was proched and extrapolation for and of the four pages was proched and extrapolation pages than four pages was proched and attempted pages than produced are equivalent or its application to the good of the feet of the such attempt in the page of the such and the pages of the such and the pages of the such and the such and the pages of the such and the such and the such as a such and the such as a such as a

Editorial

Students Wanted

To sovance the scientific study of the earth and its environment in space is tha first end primery purposa of tha American Gsophysical Union. In aupport of this purpose. one of the working goels of the AGU is to attract compatent individual students end research workers to devote their attention to gaophysics, end enother is to alimuista high quality education for students interested in geophysics. Only by attracting naw minds to addrass old problams and thus unover naw quastions can we assure the health of our science. Meny of our subdisciplinas are having difficulty holding good students through thair Ph.O.s because of the attractive opportunities evaluable to them outside the research community. This is chellange we must pick up-not just to Mour ranks, but to fill them with the creem of the upcom-

Geophysics is by nature a focus of verious deciplines on problems, and thus it has an inherent problem in cepturing

The attention of students et the undargreduata laval. There are tremendous opportunities for promising physics, cham-Istry, end mathametics majors who era totally unaware of the axciting direction thair aducation and carear could laka. To aselst you in identifying opportunitias that could be pessed on to undargraduates in your institution, Eos has begun carrying announcements of predoctoral scholarships, fallowships, and gradueta assistantahips without cherge in the classified advarilsing section. The addition of lhase sludant positions axpands tha popular markatplace for jobs in the earth and space sciences that Eos has become. Meny of thase advertigaments will be directed primarily to undergraduala sludanta. Sinca Eos doas not heve a large circulation to undargredualas, success will depend on the information in this section being passed on by lacuity advisors. You may want to copy thas notices as thay sppaar or post them or forwerd them to collaaguas in othar dapartments.

The inclusion of thasa announcements will be one in a

series of efforts to encourage good undergreduete students to pursue caraare in geophysics. It is being guidad by tha Committee on Educellon and Human Resourcas, with strong support from the Oceanography Section in particu-

To use this new eervice, send your ennouncement of svaltable student positions to Eos, Clessified Advertising, Amarican Gaophysical Union, 2000 Floride Avenua, N.W., Washington, D.C. 20009. There will be no charge for the first Insertion of euch ennouncements so long as they are 20 lines or less. Subsequent Insertions, II desired, will be run et helf the reguler cleesilled advertising rele.

Il you do place en announcement, please halp to improve the service by avaluating its impact. Send ma your evaluetton with your thoughts on other woys to assure their wa can do on even balter job of ettrecling end holding good students in geophysics.

Fred Spilheus

Continental Rifting: Progress and Outlook

8. H. Baker Center for Volcanology University of Oragon, Eugene

P. Morgan Lunar and Planetary Institute Houston, Taxas

increased research activity on continental ritis has lad to a flood of naw date in the last 15 years, but there is little consensus about the besic mechanisms and causes of rift-



TRANSACTIONS, AMERICAN GEOPHYSICAL UNION

The Weekly Newspaper of Geophysics

Send double-spaced manuacripta (four copies) to Eos, AGU, 2000 Floride Avenua, N.W., Washington, D.C. 20009, or sand free directly to one of the associate editors with a copy to the

Iditors A.F. Spilhaus, Jr.: Associate Editors: Clauda Alegra, Palar M. Bell, Kavin C. Burke, Arnold L. Gordon, Kristina aros, Garard Lachapelle, Christopher T. Russell, Richard A. Smith, Sean C. Solomon, Carl Klealinger; News Writers Barbare I. Richman; Editor's Assistants Sandra R. Marks; foe Pro-Settlen Staff: Petricia Bangert, Margaret W. Conelley, Eric Gar-ison, James Hebblethwalte, Dae Sung Kim, Michael Schwartz.

Officers of the United

J. Tuzo Wilson, President: James A. Van Altan, President-Elect; Lesie H. Meredith, General Secretary; Carl Klaslinger, Foreign Sec-relary, A. F. Spilhaus, Jr., Executive Director; Walde E. Smith, Exec-utive Director Emeritus.

herising that meets AGU standards is accepted. Contact Robin E Little, edvertising coordinator, 202-462-6903.

04, Transactions, American Geophysical Union (ISSN 0098-3941) spublished weekly by the American Geophysical Union Irom 2000 Fordig Avenue, N.W., Washington, D. C. 20009. Subscription availde on request. This leave \$5.00. Second-class postage paid at Washington, D. C., and at additional mailing offices.

Copyright 1981 by the American Geophysical Union. Material pubssue may be photocopied by individual actentials i issearch or deseroom use. Permission is also granted to use short Weles and figures and tables for publication in scientific books and ounals. For parmission for any other uses, contact AGU Pub-Celions Office, 2000 Fiorida Avenue, N.W., Washington, D. C.

firms expressed in this publication are those of the authors only and to not reflect official positions of the American Geophysical Union unless expressly stated.

Cover. Photograph shows the MBT (mesosphere, atratosphere, toposphere) radar at Poker Flat, Alaska. This NSF-tunded project was developed. Was developed by the Aeronomy Laboratory of the National Oce-Wic and Almospherio Administration to investigate strospherio manics in the height range 2-100 km. The coherent (Doppler) leder system operates continuously to obtain data on winds. waves, but operates continuously to obtain data on winder in the completed system include a peak transmitted power of 8 kW and an anianna area of 4 × 10⁴ m². As seen in this photograph, the same area of 4 × 10⁴ m². graph, the 64 transmitter modules are contained in separate houshas in the anisana array. The anisana is currently connected in a hise-beam configuration (vertical, off-vertical to the east and to the look). Although completion is not acheduled until the end of 1981, a poiling of the completion is not acheduled until the end of 1981, a portion of the system, operating et a lower sensitivity; has been hessentially continuous operation since February 1979. The building complex continuous operation since February 1979. The building complex continuous operation since February 1979. in complex at the top of the photograph is the Poker Flat Rocket Research Range operated by the University of Alaska. (Photo isker by Paul E. Johnston and aubmitted by Ben B. Baisley, both of the Aeronomy Leading Company he Aeronomy Lab, NOAA, Boulder, Colo.)

ing. Tha well-known association of lephroganic featuresdoming, faulting, and volcanism—is widaly ragarded as the rasult of asthanosphara convaction and lithosphare thinning. This concapt is supported by obsarvations of longwavelangth negativa Bouguer anomalias, and of subnormel Pn velocities in the upper manita, resulting from convective mass and haat Iransfar into the base of the lithosphere. Doming, and in soma instances laulting, is the result of isostatic adjustment to the resulting expansion. The crust of nifis is abnormally thin (70-80% of normal) and contains high-density rocks assumed to be primarily intrusive basic Igneous rocks. The collapse of rift floore may be the consequance of strass-induced lateral extension in the upper crust, possibly assisted by a mass excass of malic intrusions in the rilted crust, Anomalous electrical conductivity (low) and haal llow (high) are the result of haating and magmatic and hydrotharmal ectivity.

Sangör and Burka [1978] nava distinguished two basic modes of rilling; active rilling, in which the lithosphere is crecked by asthanospheric upwelling, end passive rifting, in which a preliminary cracking of the illhosphare occurs because of differential stresses resulting from the interections ot lithospharic platas. A variety of date sels heve been interpreted to produce cross sactions of the major Cenozoic continentel ritts, exemplas of which are shown in Floure t. Besic similarities in these cross sections mask subtle structural end avolutionery diffarences batween the rifts, howavar, end lell nothing of the processas of tithospheric thinning. It is not clear to what extant the enomalous lithosphene structure is a response, as opposed to a cause, of rifting. In s recent volume of papars on the mechanisms of graben lormetion [IIIIes, 1981], both activa and passive modes of rifting ere discussed, the lormer moda primarily in conneclion with the Easi African rift syslam and the latter with raference to the Rhinagraben. The ramarkabla similarities in rift cross sections (Figure 1) suggest that the anomalous

Rhinegraben

0 km 50

n km 50

0 km50

50

Baikal Rift

S. Rio Grande Rift

Kenya Rift

a.

100

sphere propaillos then the mode of rifling. Il is cleor that continental rilts are diverse and may form by o varially of processes. Some polaerilts on continental morgins are regorded as 'fallod arms' of sproading exos, end the East Africon rift may be e modern example of this typa. Others are spotlally ond temporally connected with collision orogany (Rhine; Baikel), end some appoar to be intraplate structures with no cloar relation to other teclonic leaturas (Osto; mid-continent U.S.). Spacial catagories era naedad for rills in complex lectonic settings such as the Basin and Range of the western U.S., which may be en exprassion of back-arc spreeding ralated to subduction, tocolly modilied by the strosses Impertad by the San Andreas transform fault. The Sneke River-Yallowstona zone is a grobenitke fasture, en elongeted dapression associated with little or no extension, and could represent a 'not-spot'

lithospheric structure of rifts is more dependent on litho-

Viawed in this fashion it seems that there is a spectrum of rilling processes for which two fundamental mechanisms can be postulated, similar to the two modes of rifting distinguished by Sengor and Burke [1978]: an activa machanism wharaby thermal energy is Irensmitted into the lithosphare from the underlying asthenosphere, and e passive mechanism by which mechanical energy is transmitted leterally Ihrough the lithosphere es e consequence of plete interaclione et a distenca. There may also be combinetions of these two mechanisms. In order to ellow the concapt of the two lundamentally different mechanisms to be tested, we proposa a lentetive classification that dividas rilts into the two basic categories:

Activa Rifting:

(1) Rift eystems connected to midocean ridges end reprasenting laterel extension ee a result of asthenospheric convection. Structure is superimposed across older structures end has strong volcenism (e.g., Eest Africen rift sys-

(2) Smalter-acele rift zonea generaled by 'plumes' or 'hot-spots,' with little or no regional extension. Localized domes ere formed by volcanism, with a trell of inactive Iroughs and grebens (e.g., Sneke River-Yetlowstone zone);

(3) Back-erc feuit zones end grebene (e.g., Basin end Range, grabans of the Andes);

Passive Rifting:

(1) Rifts associated with confinental collision orogany and formed by wedging end splitting of the lithosphere. The location and orientellon is strongly influenced by preaxisting structures, there is little igneous ectivity, and strika-slip motion mey be locally important (e.g., Rhine-Rhone and Balkal

(2) Rifts essociated with larga strike-ellp bounderies end resulling from the fransmittal of sheer stresses from the bounderiee (e.g., western Turkey, Beeln end Range).

The magnitude of ective rifting will depend on the rate at which lithosphere moves over the thermal source, with rifts being restricted to etailonery or alow-moving pletes [e.g., see Burke and Wilson, 1972]. No such reefriction applies to passive ritting, since the lithosphere thins in response to extension, and the source atresses are transmitted in tha moving filhosphere plate. Other distinctions between the two mechanisms are in the influence of prerift etructural elemente, which should be strong for passive ritting and weak (or ective rifting. Sengor and Burka [1978] give different sequences of evants for the two modes of rifting; the active mechanism predicts doming-volcanism-rifting, the passive mechanism ritting-(uplift?)-volcanism. For active ritting the megnitude of uplift and volume of ignacue rocks should be much larger than for passive rifting, and a difference in igneous cherecter may result: active-weakly alkaline to Iholelitic; passive—strongly alkaline (?). Daja relevant to the understanding of the processes are

not restricted to the earth. For 'ona-plata' planets such as Mars, the processes of rifting ere possibly easier to decipher, and the mechanisms can be applied to some rifts on Earth. The great Mertian rift, Valles Marinede, is easily, modeled in terms of the airess flaid imparted by the topog-1980). The modeling resulte strongly suggest that the rift

Fig. 1. Interpretive cross sections of (s) the Rhinegraben isolated from Prodehl et al., 1978]; (b) the Batkel rift [adepted from Zorln, 1981]; (c) the southern Ric Grande rift [adepted from Seager and Morgan, 1979]; and (d) the Kenya rift [adepted from Seager and Mohemberg, 1971], based on a variety of data sets. Baker and Wohlenberg, 1971], based on a variety of data sets. Key: straight line pattern—cruet; wavy line pattern—lithosphere or 'normal' upper mantle; stippla pattern—asthenosphere or 'snomalous' upper mantle; solid black pattern—basic crustal intrusions. rephy and the gravity flaid (Figure 2) [Phillips and Lambeck, followed the formation of the Tharsie Pieleau, Rifts are also found on Venus, a plenet that ought to be as thermally aclive as the earth but appears to lack contemporary legrestri-

Fig. 2. Magnitude and direction of the theoretical horizontal tensile (principal) devictoric stresses at the surface of the Tharsis Ploteau (TP), Mars, imparted by the topography and the gravity tield. Confoure are magnitude of maximum stress, in kilobers. Note the orthogonal relationship between the Velles Mertneris (VM) and the stresses. [Adapted from Phillips and Lemback, 1980].

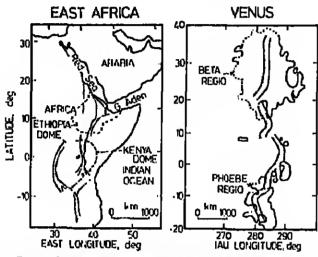


Fig. 3. Comparison between the East African rift system (cutting across the Ethlopis Dome and the Kenye Dome) and the melor Yenus rift system (cutting across the highlands of Bela Regio and Phoebe Regio). Depressions ere indicated by the stipple pattern, throm George McOill. Unity, of Massechusetts, personal communication, 1981).

at style plate tectonics. Analogies have been made between the Venus rifts and the Eest Africen rift eystem (Figure 3), but the role of rifts in the tectonics of Venus is poorly understood at this time.

Hydrocerbon, minerel, and geotharmet resources associated with rilling give an additional economic value to rift studies. Idaatty models should predict the evolution of these resources. The diversity of rifte makes this a complex problem, however, in order to obtain a better understending of rill processes and to apply adaquate constraints to models, multidisciplinery etudies of ective rifte ere needed to dascribe thair evolution and to etiow alternative mechanisms to be formutated and tested.

This problem end others will be addressed et a conference on the 'Processes of Ptenetary Rifting,' to be held December 3–5, 1981, et the Christien Brothers' Retreet House in the Napa Valley, California, Immediately prior to the fati Annual Meeting of the American Geophysicat Union (In Sen Francisco). Persons interested in attending the rift meeting should contact the Projects Office, Luner and Planetary Institute, 3303 Nesa Road One, Houston, Texas 77058 or call (713) 486-2150 for further information.

Acknowledgment

We thank R. J. Phillips for Input and criticism of this menuscript.

References

 Baker, B. H., end J. Wohlenberg, Structure and evolution of the Kenyo rift valley, Nature, 229, 538–542, 1971.
 Burke, K., end J. T. Wilson, Is the African Plete stationery?, Nature, 239, 387–390, 1972.

tiles, J. H. (Ed), Mechanism of Graben Formation, Tectonophysics (Special Issue), 73, 266 pp., 1981. Phillips, R. J., and K. Lembeck, Grevity Itelds of the terrastrial

Phillips, R. J., and K. Lembeck, Grevity Itelds of the terrastrial plonts: long-wavelength anomalies end tectonics, Rev. Geophys Space Phys., 18, 27–76, 1980.

Space Phys., 18, 27–76, 1960.

Prodehl, C. J. Ansorge, J. R. Edel, D. Emler, K. Fuchs, S. Muallar, and E. Peterschmitt. Explosion seismology research in the central end southern Rhine graben.—A case history, in Explosion Seismology in Central Europe, edited by P. Gleae, C. Prodehl, and A. Stein, pp. 313–328, Springer-Verleg, Berlin, 1978.

Saeger, W. R., and P. Morgan, Rio Grende rilt in southern New

Mexico, west Texas, end northsm Chihuchue, in *Rio Grande Rift. Tectonics and Magmatism*, edited by R. E. Riecker, 87–106, Amelican Geophysical Union, Washington, O.C., 1979.

Sengor, A. M. C., and K. Burke, Reletiva timing of rifting and voicanism on earth and its tectonic implications, *Geophys. Res. Lett.*

5. 419-421, 1978.

Zorin, Yu. A., Tha Baikal rift: An example of the intrusion of astherospheric material into the ithosphere as the cause of disruption of ithospheric plates, in Mechanism of Graben Formation, edited by J. H. Illes, Tactonophysics (Special Issue), 73, 91-

Forum

Flinn's Feature Fuels Forum

The entertaining nots by Edward A. Filinn (Information transfer in verbal presentations at scientific meetings, Eoe, 62, 179, 1981) brought to mind a somewhat similar discussion of this problem by the Scottish physicial, James Clerk Maxwell (1831–1879). Evidently, in response to a query from Professor Guihrie about the role of a physical society, which was aomething like an AGU maeting, he wrote in 1873 to W. G. Adsma [Cempbell and Gemett, 1884; p. 294]:

For the evolution of science by eoclaties the mein requisite is the partiact freedom of communication between sech mamber and eny one of the others who may ect se a reagent.

The gaseous condition is examplitied in the eoiree, where the membars rush about confusedly, end that only communication is during a collision, which in some instences may be prolonged by buttonholing.

The opposits condition, the crystalline, is shown in the lectura, where members sit in rows, while science llows in an interrupted streem from a source which we take ee the origin. This is radiation of science.

Conduction tekes pisca slong e series of members seated round a dinner table, and fixed there for esverei hours, with flowers in the middle to prevent crose currents.

The condition most is voureble to life is en intermedista plestic or colloids condition where the order of business is (1) Grestings and confused talk; (2) A short communication from one who has something to sey and to show; (3) Remarks on the communication eddressed to the Cheir, introducing metters irrelevent to the communication but interesting to the members; (4) This fets each member see who is interested in his special hobby, and who is likely to halp him; end leads to (5) Confused conversation end examination of the objects on the lable.

This pretty much describes on AGU meeting. Sleep is not explicitly mentioned, but it certainly occurs when (2) is not met, whereupon (3) flourishes, (4) is bletsnily satisfied, and (5) follows.

It is interesting, if not eomewhat surprising, that even though our lenguega has changed a greet deal in 100 years, our problems have not.

B. D. Marsh Eerth and Plenetary Sciences Johns Hopkins University Beltimore, Marylend

References

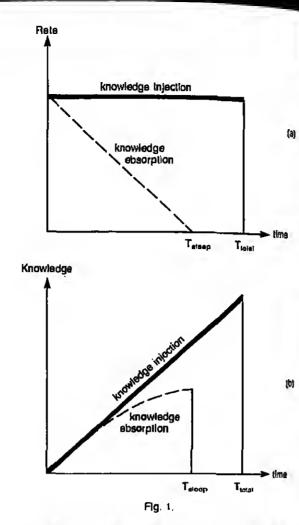
Cempball, L., end W. Oarnatt, The Life of James Clerk Maxwell, 421 pp., Macmillan, London, 1884.

In his articls, 'Information Transfar in Verbal Prasentstions at Scientific Mestings' (Eos, 62, 179, 1981), E. A. Film raises some important issues. Unfortunetely, the methemetical model is somewhat muddled. The internal inconsistency of the energysle became evident when I considered tha conclusion that program chairpersone should stop the speeker at $T_{\rm max}$. It is understandable that a former AGU annual meeting chairman should advocate such a time-concerving approach, but Film's own Figure 1 shows the knowledge absorption curve at a maximum slope at $T_{\rm max}$. In other words, he advocate cutting the epaakar off just as the audience is absorbing knowledge at a maximum

rate. Surely the optimum cutoff time would be later.

The AVT is defined as the *rate* of knowledge ebsorption, eo its decrease efter T_{max} dose not imply that T_{max} is the 'point of diminishing returna.' The author's confusion at this point in the discussion is related to aeriller embiguity as to which quantities are rates and which are integrated amounts of knowledge. This problem would likely have been avoided if the basic rule of graphic presentation had been followed: 'LABEL ALL AXES.'

Suppose we rework the analysis, paying closar attantion to the distinction between rates end integrated knowledge (Figure 1). 'Knowledge injection' is at a constant rafa (et least in Films's model). The audience attention factor goes linearly from 1 at i=0 to 0 et $i=T_{\rm sleep}$, so the knowledge absorption reta drope linearly ee shown in Figura 1a. Knowledge absorption is the integral of that rate, the quadratic shown in Figure 1b. This result is nothing like the curve shown by Films.



Film'e AVT curve cen be obteined only it the sudience ettention tector is applied directly to the integrated knowledge injection. That operation represents a model in which, as sleep approaches, the audience losss any knowledge it had gained earlier. Given that model, which may have some validity, the speaker is indeed best cut off all Timus when AVT is a maximum. Note, however, that in the case the AVT curve (not ite integral) represents the knowledge absorption.

Richerd Greenberg Nit Picket Planetary Science Institute Tucson, Arizosi

Regerding Edward A. Filnn's discussion on information trenslar in verbal presentations at scientific meetings (Eos. 62, 179, 1981), It occurred to me that a similar theoratical epproach could be developed concerning (1) the affect of consecutive talke on an audience end (2) duration (number ol daye) meetings should be. Fectors which have to be coneidared for (1) are (a) times when talks are given (low priority felke being eeeignad to timee aerly in mornings, fals in evenings, or on the last dey of a meeting), (b) the impact of coftee breaks, beer seeelons, and jet leg on both speak ere end eudience (a different function for jet lag will exist for East and West Coast meetings), and (c) the effect of competitive seesions scheduled simulteneously at opposite ende of the confarence center, or evan, as commonly occurs, in different buildings. Regerding (2), external fectors come into pley euch ae (a) hee the conferee brought his her tamily elong? (b) median travel and per diem allowancee aurylving in proposals (en indirection function of ne tionel alection rasults), and (c) the quality of local night life. Finelly, Film davotae no ettention to epeaker etrategies to maximiza reta of knowledge injection. This can be done in two ways. The first is to vary the rate of knowledge injection at different points in the talk, and the escond is to extand audienca attantion by interjection of humor, use of a trective alidee, or causing axcessive audio feedback with it tha microphona. The objective te to make the integreted AVT function more closaly approach the integreted audit ance attention function.

> Jernes N. Neill Staff Soot Deep Sea Drilling Fill Scripps Inst. of Oceanog L La Jolle, Called

New address Attach prasent mailing label hiere. Attach prasent mailing label hiere. Please all Cast weeks for charge to be effect only one half college necessary for Aguinners and all joil to state. Home Return to American Geophysical Union (2000)

News

Low-Gravity Materials Processing

The concept of growing cryetale end of doing biological studies in the low-gravity space environment assumes that the absence of most, or ell, of the influencee of the earth's gravitational field on chemical and biological reactions is an important factor—at teest important enough to justify costly

One normally thinks of the affecte of the gravitational field as being like the effects of any other field, electric or megnetic, on a thermodynamic process. In the eimplest terms, there is work done as parts of a system traval through a gravitational field; a more exact statement would be that the free energy of a system, and hence the state of equilibrium, depends on the position within a gravitational field. The thermodynamic effects of the serth's gravitational field the equation for the changes in free energy caused by differences in position within the field) are subtle but could be important in chemical and biological processes.

One of the new technologies that has amarged from the space program is the practical processing of meterials in an environment where the effects of gravity are greatly reduced or eliminated. Early work done in the list has shown that low gravity eliminates, or graatly reduces, the effects of buoyancy, sadimentation, and convection on meterials processes.

A technical exchange agreement—tha first of its kind—has been signed between NASA and Deere and Compeny, Moine, ill., to study the effects of fow gravity on varioue from elloys. Under the agreement, NASA'e Marshell Space Fight Center, Huntsville, Ala., will use low-g facilities evallable to tt—including drop tubee, KC-135 end F-104 etroraft, and possibly sounding rockats—to substantially reduce gravity conditions during alloy solidification experiments. Deers and Company will do eample preparation, ground-based characterization of the aample, extensive sample analyses, and date reduction, as well as thermal characterization of the furnace used for melting and soliditying the samples. The experiments and investigations performed under the egreement could eventually lead to Deere con-

dicting research eboard a future space abultis mission.

Osta will be shared between the two perties. NASA and
Geers personnsi will visit each other's facilities and participals in experiment plenning and analyses. The agreement is expected to be in effect for 1 year, but it may be extanded insected.

NASA currently to carrying out low-g processing in such was as elloy solidification, cryetal growth, biological seperations, and chemical and fluid physics. NASA's Materials in Space program has developed a variety of yand-based and flight fecilities and experiment hardwara to utilize the low-gravity environment and has invited industry to participate in joint investigations and projects.

In this concept for involving industry, the federal government and a private company agree to be responsible for specific portions of the research affori, and no funds are transferred between pertise. The effocation of rights to resulting invanions and date is subject to negotietion between the parties for sech effort undertaken.—PMB \$\mathbb{S}\$

WINDSAT: Space Wind Sensor to be Tested

A naw wind sensor eyetam is being tested on e meee noth of Boulder, Colo., by a teem led by Freemen Hell of the Wave Propagation Laboratory. It the teste are successful, e more advanced version of the eyetem may be tried out lete in this dacade on the Space Shuttle. The eyetem's utimale dealing would be aboard e proposed eetellite called WINDSAT.

Global wind measuremente are a vital but missing link in afforts to improve long-renga weether forecasting. Present upper-air wind measuremente, moetly by instrumented balloons, are too limited, end there is a need for an extended method.

The new wind saneing eyetam fe built around e fasar redar that can geuga the epeed with which winde era moving foward or eway from it. Maasurements come from the frequency ehiff of infrared baama reflected from wind-borne particles.

The system envisioned for WINDSAT would be able to measure the winds in layers speced 1 km apart. The prasent varsion, in which the laser beam is projected by a mirror 25 cm in diameter, has a range of 20 km. The satellite varsion would have a mirror 1½ m in diameter and would be powerful enough to ecan hundrede of kilomaters. [Source: NDAA] 38

B.S. in P.E. = \$30K/Year

Earth sciences graduates can ... [look] forward to long free of would-be employere who will try to tampt [them] with high salaries, according to a report describing a new survey by the College Placement Council (Industrial Research and Development, July 1981). This survey of the job market reports that graduates with the bachelor's degree in the sarth and physical sciences have been starting amployment at an average ealary of approximately \$22,000 per year. This figure amounts to an 18% increase over the average ealary.

Prage starting salary for the earne groups e year ago.

Another important recult to that some starting eataries for petroleum engineers (B.S. In P.E.) are upward of \$30,000 per year, which though not at all unusual, wes the top starting salary group for 1981 college greduetes. Industrial Research and Development points out that liberal aris gredue.

stes consider themselves to be fortunate it offered starting estartes of \$12,000 per year.

Pstrolaum enginears, and enginears in general, treditionally gat the bast offers; the increase in earth scientists' selsries is a notable exception this year. Meny other taids are oversubscribed and overemployed. An example of a tield that is now and has been in the past highly popular among amployees is the field of computer science. The everage sterting satery this spring for computer majore was approximately \$20,000 per year, but this level constituted only a relatively amail increase over last year's sterting satery.

As a group, angineers simply do better then any other group right out of collegs. As quoted from the College Placement Council's report (Spring, 1981), "63% of all the job offere et 181 colleges and universities surveyed by the Council went to angineers." Note though thet the engineering majors from those universities mede up only ebout 7% of the gredueles.

Nation's Water Picture Brightens

The nation's streams took e strong upturn during Juns, showing good recovery from the persistent dry trend of the previous months, elihough scettered pockets of below-normel flow ware reported in perts of the Southssat end that Wast, eccording to a month-end chack by the U.S. Geological Survey.

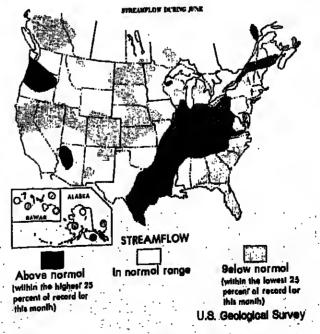
USGS hydrologiets said thet 30% of tha 165 key index statione reporting ecross the country in June showed wall-below normal streemflow (within the lowest 25% of record), e decided upward trend from Mey, when helf of the index stations reported below-normal streemflow. Below-normal flows were reported in perts of 27 states during June, down from the 31 states that reported low flows in May.

The Southeast Is, however, still severely effected by tha long months of dry conditions. A band of persistent low tlow exists from the Carolines south to Floride end west through Georgie end Alabema, Flows on some etreems in South Ceroline heve been in the lowest 25% of record now for six streight months. Thet is, 75% of the time, streemflow will be equaled or exceeded. All six of the key index etetions in Floride reported below normal flows for June, the second consecutive month that ell six stations have been below normal.

Strong recovery was noted from the Graat Lakes Ragion south through Kentucky, Tennesses, Arkansas, and most of eastern Texes, where streamflow was within the highest 25% of record for June.

Reflecting the general national improvement in June etraemflow conditions, combined flow of the "Big Five" rivere (Mississippi, Columbia, St. Lewrence, Ohio, and Missouri) averaged 1281 billion gallone a day (bgd), 30% above normal and the lirst time in 7 months that the combined flow of the rivers has been above normal.

'Individual flows of the Big Five for Juns: Mississippl River neer Vicksburg, Miss., 573 bgd, 50% ebove normal and e 48% Increese from Mey; Columbie River et The Dalles, Ore., 302 bgd, 2% below normel but 20% ebove lest month; St. Lewrence River near Massene, N.Y., 164 bgd, 3% below normel but 2% ebove lest month; Ohlo River et Louleville, Ky., 147 bgd, 270% ebove normel end 32% ebove Mey; end the Miesouri River et Hermenn, Mo., 75 bgd, 6% ebove normal end 8% ebove Mey. (Photo credit: U.S. Geological Survey, Department of the Intertor.)



Keyworth Reflects Reagan Policy

George Keyworth, new presidential science advisor, revealed what may be the elements of a new approach to the support of scientific research in the United States. Keyworth gave his first major address at the recent Research and Development Policy Seminar held in Washington under the sponsorship of the American Association for the Advancement of Science (AAAS). The United States must be prepared to relinquish its leadership position in some areas of extentility research, he etated. The U.S. will focus its science toward assuring that the country te second to note in military might.

Keyworth etrassad that the Administration'a proposad budget providas funding needed for support of the "herd" sciences. He meda the point that this country can no longer afford to meintain a leadership role in the broad spectrum of sciences, but instead must be selective. He appeared to divide the isdarel government's future funding support in science between the areas of pertinent and promising science and the disciplinae that support technology, both industrial and military. The "pertinance" was in relation to preveiling netional requirements. The "promise" was in reference to his conviction that the "payoff" of beatc research could not be expected for upwards of 10 years after a grant had been awarded.

Lika his predecessor in the directorship of the Office of Science and Technology Policy, Keyworth saas hie role not so much as an edvocete of the sciences, who has the President's aar, but as more of an advisor, a setter of priorliles

Although the main thrust of Keyworth'e epeech was thet the country'e preeminence in scientific research was to be restricted to ereas of science salected efter careful raview, hadd not indicate eupport of any stendard less then one of axcellence. Some flaids would simply have to be abandoned, but those eupported would have to be of convincingly high priority. He gave the widely held opinion that pumping more and more funds into an area of research, even one of high priority, is a process that succumbs, avantually, to the lew of diminishing returns. Support, therefore, is to be grented to assential programs, and even then, to a limited fevel.—*PMB* %

Geophysicist Obituery

J. M. Burgers, 86, dled on June 7. He joined AGU in 1956.

New Publications

Weather Modification by Cloud

Seeding
A. S. Dennis, Acedemic, Naw York, xv + 267 pp., 1980, \$29.50.

Reviewed by Charles L. Hosler

This book accomplishes its stated purpose of providing information on cloud aeeding to upperclassmen or gredualss of university programs in the physical sciences or engineering, and I would recommend it to them as a quick and painless way to become convarsant with what cloud seeding is all about. The book may discourage an even larger audience of nontachnically oriented cloud-seeding anthusiaeta or seekare of knowledge by the omission of e paragraph or two of a more elamentary and descriptive treatment of proceeses such ee nucleation, cloud formetion, and precipitetion formetion at the beginning of the chaptere treating those topics. The nine chapters cover an introduction, which includes a brief history and contaxt tor cloud seeding: 'Atmospheric Aerosoi'; 'Formation of Cloude and Pracipitetion'; 'Concepts and Modale for Cloud Modification', 'Generation and Application of Silver todide Crystals end Other Seeding Agenta'; Statistical Evaluation of the Results of Cloud Seeding'; 'The Modification of Fog, Snow, and Rain'; 'Suppression of Weather Hazards'; end 'Impacle of Weather Modification on Society.' All of thata chapters are brief and to the point. The eleboration that many of those tamiliar with the topics treeted might seek or feel necessary for completenass would have turned the book into eomething the author did not intend it to be.

The readers seeking a quick enswer as to whethar or not cloud seeding is the answer to their concern in a situation where they need rain or want to prevent or promote some weather event will be disappointed. There is no formula to apply or table or graph that will help to decide. This is as it should be because the enswere are not thet easy to determine, even by the experts. The reader seeking that information will probably conclude that he needs expert advice and that also is as it should be. The general physical knowledge and the information on the potential for weether modification through cloud seeding evertable in this book will place the person seeking edvice in a position to at leest esk the right queetione.

There is a pereistent lendency on the pari of nonmeteorologists, supported by some early claims by cloud eeeders, to presume that weather over the whole country or
even global weather can be altered by local or regional
seeding. Thus, the reviewer would have preferred e stronger case be made for the lack of e physical basis for expecting cloud seeding to effect the overell development of
wave cyclones and large-scale synoptic feetures. The casual reader mey miss the brief freshment elating that we
have no hypothesis to support this type of modification.
This should have been backed up by the reasone one
would not expect such modification.

This is a useful book by a knowledgeable author that should find its way onto the bookshelves of college teachers and technically oriented users or potential users of cloud seeding. For those interested in extensive examination of the subject. If it is a good starting point.

Charles L. Hosier is with the Department of Meteorology. Penn State University, University Park, Pennsylvania. Reviowed by K. P. Schwarz

The book is a translellon of a well-known German textbook on geodesy, which has been widely used since its publication in 1975. On occasion of this trenslation it has been revised and thue includee developments to ebout

The book is subdivided into the following aections: introduction, The Gravity Field of the Eerth, Geodstic Reference Systeme, Mathods of Measurement in Geodesy, Globel Geodesy, and Geodetic Surveying.

The introductory section reviews briefly the definition, historicel development, and organizational structura of geodesy. The second section discusses the components of the gravity potential, level surfeces, end plumb lines, the reprssentation of the geopolential by spherical hermonics, and lime vertations of the grevity field. The third aection introduces globel and tocal astronomic and terrestrial fremes end releles them to the reterence eurfaces defined by the actual end the normal gravily field. The lourth eection freets estronomic, satellije, and terrestriel positioning methods es well as the measurement of absolute and reletive grevity. The lifth section deals with the problem of determining a global representation of the gravity field by estregeodetic,

gravimetric, seisillis, or combinetion methods and discusses some implications for the structure and dynamics of the earth. The last section, somewhat of a misnomer, gives en introduction into horizonial, vertical, and gravity net-

The strength of Torgs'e Geodeey is its conciseness end good organization. The whole meterial is presented on 254 pages with sactions 4 and 5 taking about two thirds of the space. The price for this conciseness is the absence of detelled derivations. In general, only major slaps in the development ere given, end otten one has to be content with the line I lormuls. The suthor hes added, however, an extensive bibliography end has cross referenced the lext with great care. The intersalad reader can thus go back to source informallon, sithough a knowledge of German besides Englieh is mandalory in this cass. The presentation shows a good batence between the mathemetical formulation of a problem and lie descriptive explanation and thus provides the reader with a clear picture of the fundamentals and the jechniques presently used in geodesy.

in summery, the book presents the body of geodetic knowledge in a well-organized form end formuletes the main problems and solution approaches in a concise and careful manner. It is therefore welcome in a field where good lexibooks do not ebound. It le recommended es en undergraduate laxt for geodesy courses but will also serve the geoscientiel who wents an up-to-date presentation of the field without e detailed discussion of current research

The excellent quelly of printing and graphics reproduction as well as the smooth translation of the original lea add to the ettractivenesa of the book.

K. P. Schwerz is with the Division of Surveying Engineer ing. University of Calgary, Calgary, Albaria, Canada.

New Listings

Items listed in New Publications can be ordered directly from the ublieher; they ere not evallable through AGU.

Space Science Comes of Age: Perspectives in the History of the Space Sciences, P. A. Hanle, V. D. Chamberlain (Eds.), Smithsonien Institution Press, Washington, D.C. xiii + 194 pp., 1981, \$12.50 (paper), \$22.50 (cloth) Stetistical Treatment of Environmental leotope Data in Pre cipitation, Tech. Rep. Ser. 206, International Atomic Energy Agency, Vlenna, Austria, xx + 255 pp., 1981.

The Economics of Irrigetion, I. Carruthers end C. Clerk, Liv. erpool University Press, Liverpool, England, xviii + 300 pp., 1981, £20.00.

The inacceeeibie Earth, G. C. Brown and A. E. Mussell & len & Unwin Inc., Wincheeter, Maesachuestts, xii + 235 pp., 1981, \$41.00 (cloth), \$22.50 (pepsr).

The Megnetolelluric Sounding Method, A. A. Keulmen and G. V. Keller (Ede.), Eleevier, New York, xiv + 596 pp. 1981, \$144.00.

AGU Awards

The Twentieth Presentation of the James B. Macelwane Award

Ronald J. Prinn, David Southwood, and Donald J. Weidner

in recognition at eignificant contributions to the seophysical sciences by e young eclentiel of outstanding ebility







Classified

EOS uffers chamilled space for Positions Available, Positions Wanted, and Services Supplies, Courses, and Announcements. Thora are no discounts or commissions on classified ids. Any type that is not publisher's choice is charged for ni display rates. EOS is published whickly on Tuesday. Ada must be recoved in writing on Monday I, wesk prior to the date of the

Replies to ads with best numbers should be orderessed to Box. American Geophysical Union, 2000 Florida Avenue, N.W. Washington.

POSITIONS WANTED Rales per line 1-5 times-\$1.00, 6-11 times-\$0.75, 12-26 limes - \$0 55

POSITIONS AVAILABLE 1-5 times-\$2 00, 6-11 times-\$1 60. 12:26 timos - \$1 40

SERVICES, SUPPLIES, COURSES. AND ANNOUNCEMENTS 1-5 kmes-\$2.50, 6-11 limes-\$1.95, 12-26 limes-\$1.76

STUDENT OPPORTUNITIES For speciel rates, query Robin Little, 800-424-2488

POSITIONS AVAILABLE

Visiting Scientiet Position The Joint Insti-tute for the Study of the Atmosphera and Ocean, University of Weekington. Visiting scansa's with background in almospheric sciences or physical ocsanography and interests in dynamical and or geochemical sapects of climate variability. Term of appointment, one (1) year, renewable for a second year subject to the approval of the Council Closing data: September 15, 1981 Sand curriculum vitae and a brief research prospectus to Oirector, JISAO, do Department of Almospharic Sciences, AK-40, University of Washington, Ssanla.

An equal opportunity affirmative action amployer

Atmospharic Scientiat Group Head. San-o sial scientist position available immediately et tha NAICs Arec to Observatory. The successful applicant will be appointed as Head of the Almost Sciences Group and will be expected to lead that group and to porform independent research using the Arecto facilities A Ph.O. degree the atmosph ic or physical aciences or radar engineering and a record of sold research accomplishments are required Expenienca with rader studies of the strato-

sphera, mososphoro, and lonosphara or with HF modifications of the fonosphere is desirable. Salar open Please send resume and names of at least hree reforances to Or. Herold O Creft, Jr., Oirector, Arocibo Observetory, Spece Sciencas Building, Comall University, Irhaca, New York 14853. NAIC Cornell University or EOE/AAE.

Physical Oceanographor, A postdectoral rasourch position in physical oceanography is ovail-able at the University of North Caroline at Chapet fill, to bagin as oady as August 1981. Ph.O.'s with background and interests in mososcale Oull Stream dynemics, goophysical thild dynamics, or ocean acoustics are encouraged to apply. Initial appointment will be for one year with a possible con-Inuation through a maximum of three years.
Please send vitne and the names of three references to Professor John M. Bane, Morina Sciences Program, 12.5 Venable Hell O45A. University of Noith Ceroline. Chapel Hill, North Caroline 27514. The University of North Carolina is en effirmative action equal opportunity employer.

University of Haw sil/Faculty Positions. The University of Haw sit/Faculty Positions. The Dapartment of Geology and Geophysics and the Hawaii Institute of Geophyelca have openings for the 1881-1882 ecademic year. Rank is open dependent on qualifications. Wa are seeking persons who will participate in our teaching and rasearch program in any of the tollowing arees: (1) structurat geology and marine tectoriles: (2) hydrology and angineering geology; (3) marina saismology, magnetics, and gravity. To apply send a letter of thereast, a current vita and 3 letters of reference to Or. S. O. Schlanger, Chalmar, Denstrand of Denkov. S. O. Schlangar, Chairman, Department of Oeology and Oeophysics, University of Haweli, 2525 Correa Road, Honolulu, Haweli 96822 (908-948-7828), or Dr. C. E. Halslay, Oirector, Hawaii Institute of Geo-physics, same address [808-948-8760]. Open until

The University of Hawaii is an elimetive action and equal opportunity amployer

Research Associate in Physical Oceanogra-phy. Applications invited for a 12 month position as Rasearch Associate in the School of Oceanog-raphy, Oregon State University. Ph.O. In physical sciences. Must have demonstrated ability to anslyzs oceanographic data, pratarably data from small-scala turbulance experiments.

Appointed will be expected to cooperate in the

analysis of oceanic microstructure date. Salary: \$22,000. Submit application and names of threa references by 31 August 1981 to:

Douglaa R. Caldwell School of Oceanogrophy Corvallie, Oregon 97331
OSU is en affirmative ection equal opportunity

Poler Oceanographer/See Ica Dynamicist. Personnel Act of 1870 for persons now employed In State/local government or in collagae and univer-sities. This position is located within the Oceanic Processes Granch of the Environmentet Observation Olvialon of the Office of Space and Tarrestries Applications, NASA Headquarters. The position is for one year, with the possibility for renewal for an edditional year. Pay will be at a level commansurete with axperience, and will be established after a

Candidates must have been employed by tha university in e permanant position for at least 80 days or be a carear employee of a Stete or local government. Candidates must also mast the Feder al qualification standards for the position. These are as tollows: a degrae in an apprepriete lield of science, plus three yeers of progressivaly responsi-ble experience in duties related to the position. This individual will be responsible for planning. developing, and implamenting a scientific research program in satellite remote sensing of oceanic pro-cesses in polar regions. A beckground in polar cceanography, see ice dynamics, or a closely-releted field is required; experience in remote sensing, eithough desirable, is not essential. A Ph.C. or equivalent training and experience is mandatory.

Intarested parties should sand a current resume to NASA Headquerters. Attn: Mrs. Cetharina Zegowitz, Coda EPM-3, Washington, O.C. 20546. Selection for this position will be made from otherwise suitable contributions. erwise eligible candidates without discrimination for any norman't reason auch as raca, color, religion, sex, national origin, politics, merital etalus, physical handicap, age, mambership or normambership in an employae organization, or personal favoritism.

Electron Microproba Technical Specialist/ University of Colorado. The department of Geological Science, University of Colorado, Soulder, seaks a parson who will assume responsibility for the dapartment's atectron microproba laborsfor the department's atectron microprobe laboratory. Outlee will include day-to-day operation of our MAC 400 microprobe equipped with a KEVEX EDS
system, instruction of new operatore, maintenence of the microprobe as well as other X-ray equipment
within the Department, microprobe software and
herdware development, and perficipetion in research projects involving afficate, culfide and oxide
mineratogy. The job requires atther a degree in
electronic or electrical engineering, or two years of
technical experience utilizing electronic tretrumentation especiated with an electron column instrument. An individual with an M.S. degree in Oeology
and microprobe experience will be considered highand microprobe experience will be considered high-y dasirable. Salary rangas from \$20,000-\$25,000 depending on expartence. Please asnd, by August 15, latter of application and resume to Bruce Bad-ger, Parsonnal Department, University of Coloredo, 1511 University August Boulder, CD groups IS11 University Avanue, Boulder, CO 80309. Tha University of Colorado is en equal opportuni

Acquetical Physiciat. Physics and Chamisin ariment of Naval Postgredueta School (NPS) In Montarey, California, seaka applicants for tenuretrack position at assistant or associats professor level, physicial who has experience and interest in taeching and reasarch in area of acoustics. Prime mission of NPS is envanced aducation of Nevel Of ticers, Oapartmant offers M S. and Ph.O. degrees In Physics and Engineering Acquetics with major amphasis on Mastar's degrae program. Most acoustics teaching is at earlier and graduets level with concentration in underwater ecoustics. Candi date must heve Ph.C., be effective teacher and be interested in and capable of engeging in research Current ecoustics research areas: ocean acoustics including propagation, ambiant noise, scattering and diffraction; propagation in tapered wave-guides; acoustic imaging; signet processing and non-linear ecoustics. Sand resume end references to Prof. O. 8. Wilson, Oppartment of Physics and Chamis Iry, Naval Postgradueta School, Monteray, CA

Affirmative action/equal opportunity employer.

Occhydrology/Geochemiatry/Economic Coology. Applications are invited for a one year appointment effective August 19, 1981 to teach undergreduate courses in introductory geology and elements. that geohydrology, geochemiatry, or economic ge-ology. Ph.O. praterred but will consider ASD. The eition will be reannounced in September 1961 a a fenura frack elot el the assistant profassor level with reaching and research duties about 50/50. Applications including resums and names of times researches should be sant to W. O. Gosnetd, Jr., Department of Grand St., 200 partment of Geography-Oeology, University of Ne-bracks et Omahe, Omaha NE 88182. An AA/EQ amployar.

STUDENT OPPORTUNITIES

Mateorology and Physical Oceanography
Assistantiships. Research assistantiships for gladuata etudente in meteorology and physical oceanography are evallable from The Florids Stell Univerally. Research topics may cover atmospheric dynamics, physical mateorology, synaptic meleon ogy, dimutology, numarical waster pradiction, physical ocaanography, chemical ocaanography, ocaan modaling, satellita ocaanography and geophysical fluid dyna

Appointments are half-time and offer selaries up to \$10,500 per year. Beginning graduets students may be offered seleries as low es \$7,200. Students with undergraduate degrace in physics, chemistry

and anginearing are encouraged to apply.

Additional information may be obtained from Dr.

James J. O'Grien, Masosoele Air-See Interaction

Group. The Floride State University, Tellahasses.

Citation to Prinn

Mr, President, ladiee, and gentlemen: We are honoring tonight a young eclenilist who combines an unuaually broad nowledge of the chemietry and dynamics of plenetary almospheres with a healthy skepticism regarding established dogme end a marvelous ability to shrug off the displeesure ol established dogmatists.

Ron Prinn's theoretical research has significantly influenced our understanding of the terrestrial stratosphere as well as the etmospheres of Venus and Jupiter. Since 1980, when he joined the Department of Meleorology at Massachusetts institute of Tachnology, he has been a leading participent in colleborative efforts to develop numerical medals of the atratosphere combining comprehensive chemistry with reelistic dynamics. Such models have been a fich source of controversy in our continuing efforts to predict men's potential impact on the ozone layer. Prinn's work on the chemistry of sulfur geses in the atmosphere of Ve-Aus, published in 1973 and 1975, foreshedowed the explosive growth of interest in the sulfur chemistry of the terrestial almosphers. By delimiting conditions for the predominancs of either sulfur or sulfuric ecid in the clouds of Yeaus, his work provided a basis for the interpretation of Ponser Vanus date. It was Prinn who suggested that the speciacular dark markings on ultraviolet images of Venus are caused by sulfur. More recently he has discussed the contribution of phosphorus to the color of the Greet Red Spol on Jupiler. Not forseking the mother plenet, he is currently engaged in efforts to determine from field meesurements whether there is eny truth in the well-established ineory that freon, methyl chlorolorm, and nitrous oxide ere chemically liner in the troposphere.

Mr. President, it is a privilege end pleesure to present Ronald G. Prinn for the James B. Macelwene Awerd.

> Jemes C. G. Welker and Relph J. Cicarone

Thank you Jim for your very kind cliation. I em flatiered to be joining the dietinguished list of previous recipients of the Macelwene Award. It is also a delight to be reterred to 28 young egain. Beck when I wee really young, I regerded people over 30 as definitely middle-eged. My work hes required me to delve into more than one eree of specializaion, Fortunately, es t heve wendered through the diedpines of melsorology, elmospheric chemietry, and plenelary science, I have been Irealed with mercy by the Wolessionals in these arees. Perhaps this is because the meleorologiets think I am an etmospheric chemiet, the etmospheric chemista preeume I am a planetary eclentisi. and the pisnelary scientieta eee that I am in e meteorology partment and my true profession muet therefore be weelhar forecasting. However, I see that the awards commiles contains representatives from all three of these disciplines, eo i musi be immune from such a rib at least for

Any recognition coming my way this evening must in faci be shared with a number of unsatilish friends, collaborators, and colleagues. Let me take this opportunity to mention e ew of these people who have influenced my directions in beneficial ways. John Lawie menaged to enlice me away from a career in moleculer quenium mechanics and showed me that speculation can be en occasionelly re-Speciable vocation. Norman Phillips successfully guided me his the than largely allen environment of meteorology and Wes instrumentel in the formulation etages of the etrelospheric model, which Jim has mantioned. My collaborejors h this modeling work, Fred Alyea and Derek Cunnold, have done a large part of the day-to-day work on the model end, In addition, are my colleborators in the fluorocerbon lifetime experiment, which hee also been mentioned. Don Hunten has been burdened with refereeing an unseemly number of my publications and has been blunt when necessary end ancouraging when needed. Gerry Wasserburg showed me by example that scientists should be actively involved in the occasionalists. occasionally thankless lask of guiding and advending their fields, and not merely reap the benefits of others' efforts in lhese endesvora.

The citation of my work in planetary atmosphores carries perticular pleasure. Il hes frankly been a joylui lask lo explore the pholochemistry of apperently exotic elmosphoric apedas such as hydrogen chloride, carbonyl sultide, phosphine, and thiozone, it is also my belief that research in planetary elmospheres cen end has had importent implications for our own elmosphere, in addition to heving its own intrinsic fascination.

I sincerely thank President J. Tuzo Wilson and the Amor-Ican Geophysical Union, and in particular the Macelwane Awerde Committee, chetred by Gerry Wesselburg, for this unexpected yet gladly eccepted award.

Ronald G. Prinn

Citation to Southwood

It is indeed en honor and e pleasure for me this evening to introduce to you one of the recipients of the Macelwane ewerd, Dr. D. J. Southwood of Imparial College, London, England. This ewerd is presented ennually by the American Geophysical Union for outslanding contributions by a young scientist. It is very filting that David be selected this year.

Devid, e Brilish cilizen, wes born in Torquay, England, in 1945. Mothers of email children lake heart. According to Devid's mother he did not ulter his lirst words until etter the age of two. However, he has not been et a loss for words since. Shortly thereafter he entered Queen Mary College in London. Leter he became a postgreduete student under Professor J. W. Dungey et Imperiel College, under whom he wrote a lheels entitled 'Theoretical Studies of ULF Wavee in the Megnelosphere, receiving his Ph.D. in 1984.

Shortly effer gredualion, David spent a yeer et UCLA, continuing his work on magnetic pulsations end, on the side, leeching me much of what I know about the underlying physics of the megnetosphere. After his stey at UCLA he relurned to Imperial College es e lecturer, but David soon got tichy feel egain. However, since then he hes usuelly satisfied hie urge to travel by elmost ennuel summer viells to the U.S. We et UCLA heve been fortunale enough to heve him join ua five times in the last 10 yeers.

David's initial contribution to magnetospheric physics was e theoretical and experimental investigation of the Kelvin-Helmholiz instability at the magnetopeuse. He later looked et weve-perticle resonancee within the megnetosphere and their effects on cross L diffueion. Together with hie student, W. J. Hughes, he examined the effect of the lonoephere on magnetic pulsatione end brought order end comprehenelon to an otherwise confused elituetion. Together with Margaret Kivelson of UCLA he exemined the effects of electric fields on magnelospheric particle motion end, in perticuler, elded inding of the physics of particle injection into the megnetosphere. Most recently he has been putling order into our understending of the way in which the Gelileen setellite lo injerecte with the Jovian magnelosphere.

I can't help remarking es I did here eeveral years ego (Eos, 58, 872-873, 1977) that having a name in the latter helf of the elphabel helps one to win the Mecelwane award. However, Devid's deceptively simple name has also lad him on occasion to gain less credit then he deserves. Recently, for example, he was referenced seven times in a peper ae Soulhward (Geophysicel Research Leffers, 7, 881-884, 1980). On another occasion e proposal was sent into NSF with hie name on the cover written as Smellwood. Parhaps tonight's ceremonies will help ue remember David'e reel lest name.

I would like to close this introduction by reading the citation prepared by the awards committee [and] which very accurately summarizes David's contributions to deta.

Over the last 14 years, Devid Southwood has substenfially advanced the epplication of magnetohydrodynamles to epace plaemes end, particulerly, to the earth's magnetosphere. His Ph.D. thesis on the Kelvin-Halmholtz instability at the boundary of the magnatosphere was a landmark in the field. Over the leat decade, he has become perheps the leading expert on the theory of magnetohydrodynemic waves in the magnetosphere. He has made a substantial contribution to the

theories of magnetic-field-line resonence, of the generation of magnetic pulsetions by the Kelvin-Helmholtz inslebility, and at the influence of the lonosphere as a boundary cendition on megnelohydrodynamic weves. in general, his research was a major lactor in the theorelicel developments needed for the interpretation of the lest decada's increasingly sophisticeted space- and ground-besed observations of 'geomegnetic micropulselions.' He has elso worked activaly and productively in other areas of space plasma physics. By means of clever but simple celculations, he has contributed significently to the theory of targe-scele plasma mollons in tha earth's magnetosphere end, perticularly, to the underelanding of the transport of perticles into the ring current end the Van Alian betts. This work on the earth's magnelosphere, and eleo his very recent work on the interaction of to with Jupiter's magnetosphere. has been charactarized by creativity, by clear intuition. by deep understanding of physics, and by the preclous ability to bring theory into effective contect with obser-

Christopher T. Russell

Acceptanca

I em very honored to receive this eward, and in apila of the citation you have just heerd I think my ability has been to be in the right places and to work with the right people. At Imperial College I work with two close colleagues, Jim Dungey and Stan Cowley, without whom I would not bo hore. I have worked with Jim since my postgreduole days, and one thing I am indubled to him for is converting me from a malfromaticing to n physiclet, somothing I have not

There are largo numbors of people t invu worked with at UCLA. I shall single out Mnrgarol Kivelson for mention. It is good to work with a clover colleague, even botter it she has shared attitudes and complementary skills, I have also noticed she is charming and attractive and a stickler for corract use of grammar.

I have one unusual working relationship. My mother works in the same group as me. We have more or less worked out who works for whom. Though widowod when I was quite young, she successfully raised mo and my brother. Late in life sho stricted a technical oducation only to ond up working in the same place as both her sons.

Another close relative to whom I owe a great deal is my wife, Sue, who has divided her attention between activities such as raising our three children. Anna. Michael, and Peter, and ministering to me more than I deserve, but also including setting up her own business and involvement in a variety of outside interests.

There are tots of other people who should share some of my glory, I cennol name them all, but I am aware that e very large traction are American. Probably all Europeans speculate at some time on the American they might have been. I worked here enough to know, and I have had a lair Immersion in American values. I am not original in pointing oul values ere often hilariously the opposite of my native Brillish ones. Sincerity (or boring seriousness) is an Americen virtue. Cynicel will (or flippant insincerity) is a prized British social skill. I em busy cultivaling e heppy schizophrania where I eccept both sides. In particular I like Americen enihusiasm for hard work and your optimism ebout chenge. These latter ettiludes make for a dynemism in U.S. science I heve always found excling. Thanks to you all for

Finelly, let me sey something on the virtues of trevel. It broadene the mind, challenges the digestion, cements cotleboretton, heips internetional understanding but, unfortunelety, costs money. I would like to thank the several funding agencies end grent-ewarding bodies in the United Kingdom, United States, and eisewhere who have helped me lo trevel. Was II not e scientist who seld, 'It I have traveled further than most, it is because I have been the holder of

David Southwood

Citation to Weidner

of Introducing Donald J. Weldner. He hee been a ploneer in the development of the Brittouin ecattering method of measuring electic moduli of minerale. Shortly after joining the taculty of the Department of Eerth end Space Sciences at Stony Brook, New York, in 1972, he became interested in Brillouin scattering and elerted to build a research teb for the epplication of Brillouth scaltering to the investigation of elestic properties of minerale. He recognized the value of the technique in making meesurements on very smell eamples, e capability that makes it particularly stirective for examining quenched high-pressure phasea and other eamples thet are available in very amail sizes. In the short time since he established hie leb, he end his colleagues end eludente heve made measurements on meny importent rock-forming minerals and have reported the results in a number of excellent professional papers. In many cases the meesurements were made on tiny apecimene which ere barety vielble to the human eye end whose elastic properlies could not have been meesured in eny other wey. Concurrent with this work, he has continued his studies in asismology as well as [hie] theoretical investigations [into] the elastic properties of cryelais.

Mr. President, ladiee, and gentlemen: I have the pleasure

The davelopment of a new technique end lie application to the ecculsition of date that would otherwise have been unobleineble is a big challenge. The success of Donald J. Weldner in this endeavor attests to his exceptional abilities.

AGU

Highlights: Spring Council Meeting

Council members presont at the May 24, 1981, meeting wero Keiiti Aki, Slaven Burgos (lor Jim Waltis), Peler S. Eagleson, E. R. Engdahl, Citarlos E. Helsley, Jamee R. Heinzler, Carl Kisslinger, Leslie H. Meredith, Chris N. K. Mocers, Norman F. Nees, Marcia M. Neugebauer, James J. O'Brien, Richard Rapp, Cerl Sagen, James C. Sevege, Josoph V. Smith, Fred Spitheus, Donald L. Turcotte, James A. Van Atlen, J. Tuzo Wilson, end Jey Wineton (for Elmer R. Reiter until his arrival at 6:50 P.M.). David Strengwey, rapresenting the Canadian Geophysical Union, and Peter Sleinhauser, representing the European Geophysical Society, were special observers at the meeting. Council meetings are open, end a number of section secretaries, commilitee chairmen, journel edilors, and other membere atlended. The following major ections were adopted by the

Councit: The experiment of publishing oceanography and lowerelmosphere pepers in JGR Green issues alternate to those conteining upper-almosphere papers will be continued through 1982. From preliminery indications the experiment seems to be working, but a full yeer of data, including a renewal cycle, le needed to assess the success of the experiment. Final decision will be made prior to the 1983 dues

Publication of a bimonthly journel devoted to tectonice will begin in 1982, 8ecause there will be no page charges, the journal will be strictly limited as to the number of pages published snriuslly. Printing will be from author-supplied copy. The cutlins of this proposal wea given in the aditorial column of the April 7 Issue of Eos.

The AGU Congressional Science Fellowship was continued for 1982-1983. In discussion of this issue it was noted inat congressional staffing tends not to include scientists, and therefore science is not represented in the congressionel committees. AGU participates in the AAAS Congressional Fellows Program.

Participation in the AGI (American Geological Inst Minority Scholarship Program was continued through the 1982-1983 school year. The program hee attracted many good applicante. Applicents funded by the AGU confile ere designeted AGU echolare. The eections accepted the responsibility for accepted

nominellons for AQU fellows. It was thought that in the applicants will be considered first by those most family with the fallows. Touche Rose end Compeny was selected again as 10 with the field. auditors for 1981.

A \$10,000 contribution was approved as seed more planning a series of films in the geophysical sciences. National Academy of Sciences is investigating the possity of producing a new series along the lines of those poduced attains the contraction. Actually, and the series along the lines of those poduced attains the contraction and the series along the lines of those poduced attains the contraction and the series along the lines of the series along the s duced after the IGY If the films go into production, AG

will be lieted among the sponsoring organizations.

The annual business meeting of the Union was field in meeting of the Council meeting mediately after the adjournment of the Council meeting.

ANTON L. HALES SYMPOSIUM

The Geosciences Program of The University of

"SOME RECENT ADVANCES IN

GEOPHYSICS"

on October 5-6, 1981, in honor of Dr. Anton L. Hales

The Symposium will consist of two days of invitad

mia and industry on recent developments in geophys-

tsiks by internetionally known speakers from ecede-

ics with en emphasis on seismology. Topics will in-

clude recent COCORP results, modelling reflection

stion of seismic waves, and global tectonics.

setsmograme, heterogenaous earth etructura, attenu-

For additional details and registration information,

contect Richard M. Mittarer or Ronald W. Ward, Pro-

arsme in Geosciances. The University of Texas at

Dallas, P.O. Box 888, Richardeon, Texas 75080.

on his 70th birthdsy.

Telephone: 214-690-2401.

Texas at Dallas will sponsor a Symposium entitlad

Doneld Waldner is not only an accomplished eclentist but a person who hee already guided end inspired a number of promieing younger eclentists to begin carears in seismology and solid etata geophysics. Mr. President and officers of the Union, I pragant Donald J. Weldner for presentation of tha 1981 Macelwane Award.

Thomas J. Ahrens

Acceptance

Thank you Tom for your kind remarks. I also thank tha Amarican Geophysical Union for honoring ma with thie

Thia award ia particularly gralllying to me insomuch as it relates to a few sspecia of my life. Evary morning when t confront the mirror I discover that my torehead has made yet another sdvance on my hairline. Even worea, thosa teller than I tell me that my forehaad te about to conquer tha vary lop of my head. I find my jointe groaning as I do simple tasks. Gradusie sludente are now handliy trouncing me st squash. I look across the campus and esk who ere these children, only to find out that thay ere the gradusting clase. With all of these observations at hand, I cherten the part of the Macelwane citation which raade "young scien-

I sm elao vary gretilied by the recognition of my research given by this sward. As I am eure le true oi most oi this sudience, there have been many hard houre lete at night, many Irualrations, and a lew euccessas. There are timae when we wonder if enyone caree obout what we're doing. There are limas when we quastion if we abouidn't be doing somothing alsa. The monatary raworde associated with s faculty position are traditionally small. It is under those circumstonces that an award such as this one aervea to renew ona's vigor.

But, in the final analysia we raalize that we do not pursua science for the awards or poreonal recognition. As the physicisi, mathemotidan, philospher Henri Poincaré onca said, 'The scientist doas not supply natura because it is usefut; he sludias it because he delights in il, end he dalights in it because it is beautiful.' Clearly we hope thei our rasults may be usaful to others, but it is the beauty of nalure and the axcitement of discovery that drivas us and not the pursuit of awards.

Il Sir Isesc Newton 'slood on the shoulders of glants,' I stand as o dwsrf smong giants. Many people have helped me personally and prolessionally. Foramost, le my wila, Daboreh, who has chearfully helped end supported ma both in the easy times as well as the hord ones. My brother Jerry showad ma by example how a sciantist should think. My savisor, Kal Aki, nurturad ma at a young age and alded my devalopment. Graduata students at Stony Brook both contributed to my rasesrch progrem and provided water from the fountain of youth. In particular, I wish to scknowledga Michael Vaughan, Alan Kalka, Jay Bass, and Andy Au. The Institution of Stony Brook and my colleagues in the Dapartment of Earth and Space Sciances heve provided an atmosphera of stimulation, collaboration, and whan necassary, equipment that has allowed my research program to sdvsnce. The National Scienca Foundation has been ganerous in their support. To all of theea I am gratalul.

Since learning that I was to receive this eward I have, on many occssions, considered relusing it. One such time was whan I had to prapare this speech. Awarda such as this coma with many liabitillas. University administrations often equate recognition of achievement with administrative sbillty; tha result being a quantum increase in university committee work. One's colleages euddanly become more critical of the recessrch program and question why the AGU committae aver chosa this ona to receiva an award. More importantly, however, such an award brings more responsibility. The recipients must now live up to the honor that they receive. I sm awestruck when I raed the names of previous recipients of the Miscalwana award. The fredition of sccompllehmant that they have set since receiving this award le intimidating, and tiving up to this tradition is truly a great challenga. I am honored to have my name listed along with thairs, and in the spirit of accepting this challange, I gratefully accept the Macelwane award.

Donald J. Weldnar

Sponsors of 1981 New Members

Two hundrad lifty-nina new members were elected batwaon May 1 and Juna 30, 1981. Tha AGU membara who sponsored them are listed below.

Three Members: Alan R. Bandy, Richard L. Carlson, Nevilla L. Carter, H. W. Dosso, R. E. Horita, Garard Lachspella, Patar J. Maroulis, Lawrance A. Taylor.

Two Members: Bruca A. Bolt, Kevin Burka, Chan-Tuno Chan, David M. Christlo, Ralph J. Cicerone, Jacques W. Dellaur, John F. Dewey, H. P. Eugatar, R. Allan Fraeza, Kazuya Fujita, G. D. Garland, Robert Gallar, Hugh C. Haard, Mark H. Houck, Florian K. Lahnar, Bruca D. Mareh. David W. McGrall, Ronald T. McLaughlin, Harry Y. McSween, Msilo J. Molina, Patar Molnar, Marie Mortaaws. Jamea R. Rice, Garaid Schubert, K. P. Schwarz, Georga F Sharman, A. K. Sinha, John M. Sinton, John C. Stormar, Jr., Francisco Suaraz, T. E. Unny, Rob Van dar Voo, David R. Veblan, James A. Whilney, David V. Wiltschko, Derak

One Member: Maha Abdalla, Sunil Kumar Addy, Thomas D. Ailken, James Iwan David Alexander, Raymond Andarson, Raymond E. Arvidson, Larry P. Atkinson, Milo. M. Backua, Anloina Badan-Dangon, Samual J. Bama, Aaron Bames, Larry Barrows, Douglas R. Baumgardt, John W. Beicher, James P. Bennett, Jonathan H. Berg, Robert A. Berner, Robart L. Bernstain, Glann O. Bertiaux, N. K. Bewtre, Kavin T. Biddle, Selena Sillington, Jackson O. Blanton, Jamee G. Blancoe, W. Frank Bohlen, Sisphan L. Bollvar,

W. F. Brece, Rafael L. Bres, Devid A. Brooks, Larry D. Brown, Robert C. Brown, Roger G. Burns, Peter Bueeck,

Dougles R. Caldwell, Melcolm J. Cemball, Philip A. Cendels, G. R. Csrignan, Richard W. Certson, Robert F. Csrison, Robert S. Carmicheel, Chalon L. Carnahar, Roy Carpenier, Edward Chang, Richard L. Chaee, David Chavez, Abraham H. Chen, Garry K. C. Clarke, Lawrence Colin, Bestlean Jscob Collette, Jim Constantz, Bruce H. Corliee, Petar Cornillon, Allan V. Cox, Petrick A. Crowlay, C. Cunnane, Paul E. Demon, Jemes F. Daniel, Khirod C. Dss. Geffrey F. Devlae, John N. Dsviee, Psul Dsvia, Richard W. Davie, David R. Dawdy, Roland A. de Szoeke, Anthony Charles Daleny, Steven R. Dickman, Robert S. Dietz, S. Lawrence Dingmen, Richerd Ditteon, Jsnet A. Docka, John H. Doollttle, John J. Dowling, John J. Drake, Al Dubs, Fredrick Duanneblar, Timothy Durbin, Willism B. Durhsm, Rob-

Petar S. Eagleson, Stephen Ehrenberg, Leo M. Elsel, Robert M. Eills, Brooks B. Ellwood, Terry Engelder, Irene M. Engla, Albert J. Erickson, E. J. Essene, J. R. Evsna, Dsvid Fahlqulat, Donsid Farley, Garald L. Feder, Michael Fehler, William C. Feldmen, Myron B. Flertng, Erik G. Finnstrom, Harold Ceriton Fitz, Jr., Doneld W. Foreyth, Edward A. Frankovic, Cerl Fricks, Cliff Frohilch, Yoshio Fukso, Anthony F. Gangi, Douglas H. Garbin, Michael O. Garcia, Gaorga Donald Gsrilck, Joal R. Gal, John Williem Gelesman. Walter Gekelman, Danial T. Georgi, Joe Gettrust, Christoph K. Goertz, Fraser Gogg, Alsn Goodecre, Sersh Goodin, John T. Goeling, Dannie Gredy, James W. Gransih, Norman K. Grant, Ronsid Graeley, John P. Graanhouee, Eugana Greastadt, L. Trowbridga Grose, D. Gubbine, John H. Guawe.

Bradford H. Hager, Douglise A. Helth, Francia R. Hell, James M. Hell, Leo M. Hall, Sluart A. Hall, Donald R. F. Hsrieman, Gragory D. Herper, Trevor Nall Hsrt, Akira Hseegswa, Richard H. Hswkine, Stanley P. Hsyes, James Fred Haye, Walter J. Helkkila, Doneld V. Halmbergar, John H. Helsdon, Jr., Jlm Harring, Norman Harz, John B. Higgins, Joseph W. Hirman, Robert M. Hirsch, Eve J. Hoffman, John H. Hoka, Robert W. Houghton, Shih-Ang Hsu, Kennath L. Hunkins, David Huntlay, Violet Rosemery Strachen Hulton, Simon Ince, Mizuho lahide, David D. Jackeon, Wollgang R. Jacoby, Reymond Jaanloz, A. I. Johnson, Peler Jumars, Glann H. Jung, William A. Jury, Jeck A. C. Kaleer, Douglas L. Kana, Willem M. Kestner, John Katsulrakis, Robert Kay, Elvin Kellso, Paul Kintnar, Psul H. Kirshen, Peter K. Kitenidis, David M. Klumpar, Kennath P. Kodsma, Nicholas Kouwen, Stematios M. Krimigls, Richard J. Kuli-

Psul E. La Violatte, Theodore C. Labotka, Antonio C. Laaaga, Charlaa Russall Lawranca, Lawranca A. Lawvar, Tay-How Laa, Tlan-Chang Laa, Shaul Lavi, S. Banadict Levin, Edward R. Levina, Robert C. Llabarman, Marvin Llilay, Robart J. Lillia, Thomss E. Lisis, Ivan Lissauer, S. W. Lohman. Marc Lolaelle, Richard R. Luckay, W. C. Luth, Gregory A. Lyzanga, William D. MacDonald, Petar F. Mec-Dorsn, David C. Major, William V. R. Malkus, Josa Robarto Manzano, Quarvain Mercal, George O. Marmorino, Philip Marsh, Edward A. Martell, John C. Maxwall, Michael J. McEacham, Patrick S. McIntosh, Malcolm C. McKanna, Dan McKenzia, Willism F. McKenzia, Karen McNally, R. H. McNult, Murray B. McPherson, Michael O. McWilliams, Ronald Mesa, H. J. Melosh, Wendell W. Mendall, Richard P. Mlad, Chaeter Miller, Gary L. Mille, Andrew S. Milman, Hiloshi Mizutani, Alian Moench, Erik Motio-Chriatensan, Eldridga Moores, Millett G. Morgen, Donald A. Morrison, Marshall E. Mose, W. R. Muahlberger.

Andrew F. Negy, Michsel T. Naney, T. N. Narasimhan, Donsid R. Nialsen, Aheron Nir, D. Kirk Nordstrom, Deg Nummedel, Amoe Nur, K. M. O'Connor, Jerry S. Olson, Peter Olaon, Nali D. Opdyka, Marehell Orr, Harold D. Orville, Aaron J. Owene, Surendrs Psl, Cart D. Pslmer, James J. Papika, E. M. Psrmantier, David K. Parrish, Dsvid F. Peskausky, Tsung-Hung Peng, Wsyne D. Pennington, Mary Jane Perry, Alan R. Pelarireund, John A. Philipotte, Kathlean Poole, Thomas A. Polamrs, Fredrick Prehl, Ronsid G. Prinn, Edward L. Procyshyn, Willism A. Prothero, Jr., Philip D. Rabinowitz, Srinivas Q. Rso, Kennath H. Reckhow, Ian Reid, R. J. Ranard, Sci Raenick, Rsy T. Reynolds, Philip G. Richarde, Randsii M. Richardson, A. K. Richter, Robert E. Rieckar, John K. Robartson, Edwin S. Robinson, Robert Robinson, Raymond G. Robie, Michael G. Rochester, C. K. Ross, John W. Rudnicki, Pairick J. C. Ryell,

Nsdi Adeeb Saad, Robert A. Saar, Takao Ssito, Yosiko ato, Ulrich Schmidt, Jenal A. Schrsmke, Stevan J. Schwartz, Harry E. Schwarz, Cherlee B. Sclar, Jon T. Scott, Donald R. Saely, Sandro Serra, Allan M. Shapiro, Denis M. Shaw, Kuninko Shimazaki, Charlee H. Shultz, David W. Simpson, Shri Krishna Singh, Jamee R. Sisck, Norman H. Sleep, A. P. Slootwag, Douglas Smith, Raymond C. Smith, Stuart D. Smith, J. Arthur Snoka, Bengt Sonnarup, Thomas W. Spence, Joseph J. Spigal, William A. Sprigg, P. Srinivaaan, Jary Russell Stadinger, R. R. Staeves, Rainar L Stanzal, Don Stlarman, Edward Stolpar, Kelth D. Stolzanbech, D. W. Strangway, Robert G. Strom, Wilton Sturgea, John S. Sumnar, Klyoehi Suyehiro, Lynn

Roneld C. Tsylor, Michsal D. Taubnar, Lawrence W. Teufal, Thomas M. Tharp, Friedrich Thallen, Dsna Thompson, Jr., Kent W. Thomton, Robert Thunnall, George R. Tilton, Allred Toennissan, Marahs R. Torr, Alian H. Treimsn, Carl Christian Techerning, Jan Tullis, Terry E. Tullia, Donald L.: Turcotta, Amjad Urnori, Kennath L. Veroeub, J. Vaverka, Thomas A. Vogal, Richard Vondrek, Joachim Voss, Devid Walkar, Reymond J. Walker, Chl-yuan Wang, Wendell D. Waart, Thomas A. Waaver, John B. Waeks, Donald Waldnar, Alan Walch, Erhardt P. Werth, Warren B. While, Willism B. Whita, Albart J. Williams, III, Douglas F. Willlams, Richard T. Williams, Clark R. Wilson, John W. Winchestar, Donald U. Wisa, Georga T. F. Wong, Tang-long Wong, Eric Wood, Jamea Wright, Francis T. Wu, Klychumi

Travel Grants for IAGA and IAMAP Assemblies Awarded

AGU recently received from the National Science Foundation block travel granta for U.S. scientists to attend the Third Scientific Assambly of the International Association of Meterorology and Atmospharic Physics (IAMAP) to be held In Hamburg, Germany, August 17-28, 1981, and the Fourth Scientific Assembly of the International Association d Gaomsgnallem and Aaronomy (IAGA) to be held August 3-15, 1981, In Edinburgh, Scotland. The IAMAP proposal wse cosponeored by Amarican Meterorological Society.

A total of 54 eclentists were lunded with the two grents. and the sciantiets ranged in age from 26 to 71, with the avarage aga of 42 for the IAMAP grant recipient end 39 for those receiving IAGA grante. Fifteen were from the easiern part of the country, 18 from the central part, and 21 from tha waat coset, including Alaska. Two students were among those lundad, one from each grant.

There were 53 spolicania for lunde from the IAMAP grant. OI these, 33 were lunded with sverage grants of \$775. Four will go to both the IAGA and the IAMAP meet-Inge: Janat G. Luhmann, Knut H. Stamnes, David J. Sigvanson, and Robert G. Ropar. Othere receiving grents to sitend the IAMAP meeting are Richard A. Anihas, Suean K. Avery, Louis J. Battan, Alfrad K. Biackadar, David W. &u. chanan, Andre A. Donesud, Kerry A. Emanuel, Claude J. Franklanoul, Michael Garstang, David D. Houghton, Berry J. Huebart, Koll O. Jayaweera, Csrl W. Kreltzberg, Riched Gsry Layton, Yaong-Jar Lin, Bysrd W. Mosher, Dsvid G. Murcray, Jaroma Namiaa, Gragory D. Nasirom, Tekeehl Ohtaka, Joyce E. Panner, Roger A. Plelka, Ruth A. Reck. Gary J. Rottman, Philip B. Rueeell, David C. Sands, Vinod K. Saxena, Ruesall C, Schnall, and Anna M, Thompson,

Thara wara 73 applications for funds to strend the IAGA meeting, of which only 21 could be funded. The average grent wae \$800. Grant recipiants ara Sushil K. Atraya, Subir K. Banariee, Jaffray M. Forbes, Michael D. Fuller, Suman Ganguly, John T. Gosling, John F. Harmancs, David D. Jsckaon, Margarat G. Kivalson, Shallandra Kumer, Sleven P. Lund, Christopher P. McKay, Christopher T. Russell, Michael Schulz, Thomas J. Shankland, Anlony C. Freser-Smith, Rob Van dar Voo, Craig A. Tapley, Reymond J. Wsikar, Richard L. Walterachald, and Richard A. Woll.

Meetings

International Radio Science Meeting

Tha 1982 Inlarnational Symposium sponsorad by the IEEE Aniannaa and Propagation Sociaty (IEEE AP-S), the National Radio Sciance Meating sponsored by USNC/URS Commissiona, and the Nuclear Elaciromegnatic Pulse Meating (NEM) will be held jointly at the University of New Maxico in Albuquarque, May 24-28.

A joint call for papers hae been lasued. Abstracts, due Jenuary 4, should be sent to Kendell F. Casay, The Dikewood Corp., 1813 Univarsity Boulavard, N.E., Albuquerqua, NM 87102. Requests for general meeting information should also be directed to him. Inquiries on the technical program ehould be directed to the respective lechnical program commilles chairman: IEEE AP-S: X.F. Ceeay and B. K. Singarsju; USNC/URSI; K. F. Cesey; and NEM: K. C. Chan and L. D. Scott.

information on accommodistions and trevel ehould be tequestad Irom Danise Griego, Albuquerque Convention and Vialtors Buresu, 401 Second Street, N.W., Albuquerque, N.Max. 87102 (talaphona: 505/243-3989).

Coal's Effect on Water Quality

A call for papers has been lasted for the Internetional Conference on Coal-Fired Power Plants and the Aquete Environment. The conference is scheduled for August 16-18, 1982, In Copanhagen, Danmark.

The meeting will addrage three sources of water polition (thermal, solid waata, and alrooma particles) and the comsponding prevantion massures.

The conference is eponeored by the international Association of Mariana in the conference in the confe ellon on Walar Poliution Rasearch, the International Union of Pure and Applied Chamistry, and the Nordio Cooperate Organization for Applied Raseerch.

Dacambar 31 la the desdlina for abstracts. For eddition Information, write to Dia Congresa Sarvice, Linda Alle 48. DK-2720 Copenhagan, Denmsrk, 88

Ocean Sciences: AGU/ASLO Joint Meeting

Fabruary 16-19, 1982 San Antonto, Texas Convanor: W. D. Nowlin, r., (AGU) and R. W. Epply (ASLO) Call for pepars published

Joint Meeting in Eoa, Juna 23.

EN SCIEN

AGUASLO V

February & B 600.

1981 Spring Meeting Report

Approximataly 2150 perticipents registered for the 1981 Spring Meeting. More than 1500 papers were presented. The speciouenass of the Baltimore Convention Center provided ample opportunity for stiendaes to exchange treas and interact with their colleegues. Here are some candid shots.

Changes to the program and Ista and revised shstracts are printed below.





Papars Not Prasented

G38, K. S. Wallsca et al. GP58, T. M. Hosr and C. K. Seyfert H73, D. P. Dethler; H75, S. W. Whaatcrstt and R. W. Buddemair; H79, L. E. Duntap and J. M. Spinazola. M2, R. M. Endlich al al.; M9, P. G. Black et al. 018, C. T. Carlson at al.; 018, W. McLaish at al.; 078, R.

Chembers and N. Hewley; 0103, R. J. Spancer et al.; 0132, F. R. Slegel end S. Bloch; 0133, T. J. Barrell; 0134, T. J. Berratt et el.; 0152, D. G. Aubrey end P. E. Speer. P45, S. Kumer and H. A. Taylor, Jr.: P54, T. E. Crevens

S9, R. G. Deniel; S10, M. Capulo; S31, S. R. Taylor; S33, M. E. Monlort; S81, C. A. Langston; S87, C. A. To-







SA62, S. Ganguly.

SM39, D. R. McDlarmtd; SM50, P. F. Fougere; SM60, R. D. Sears; SM57, C. W. Dubs; SM93, H. H. Souer of nl.; SM142, H. A. Garcia; SM174, W. Calvert.

T39, M. C. Malin; T40, M. P. Ananda et al.; T78, O. L. Anderson and Y. Sumino; T101, S. N. Cohn; T141, G. Mavko; T188, L. D. McGinnis at el.

V2, A. Meijar; V55, B. C. Chakoumakos and G. V. Gibbs V77, J. Hamel at al.: V144, T. A. Hudson and R. D. Dallmayer; V152, A. A. Eggars; V191, A. Baldasari; V208, E. S. Patara et al.; V209, J. R. Smyth and F. A. Caporuscio:

Late Abstracts

CA INVITED PAPER

STRUCTER IN COMPENY AND GEOPHYSICS

t, t, Varia Lives (sid st. Lamont-Dobetty Scological Chrystory of Columbia University, Palinces, Rev York 19945 and Department of Goological Situaces of Columbia University, New York, New York 1995

The advant of althmetate on orbitting stallings, bryinging with EXYLAS in 1973 to distilling, bryinging with EXYLAS in 1973 to distilling, bryinging with EXYLAS in 1973 to distilling, bryinging with EXYLAS in 1973 to distilling by the cases to be determined with gut purchison. Eader altimaters usesure to disease between the seculities and the tatastactons ser-nurtace which, he oresait tiples grorespade clonely to the gnotd. The good tackings distilling a clonely to the gnotd. The good tackings did sturbences due to otsease tiples, and the seculities of the series of the small it setts to less to make a tiples and the series of the same life of the series and variangths. The sease and the same been observed over samegames, resided the tecture, puriture the metate of the same life of the sam

Maid A. Mettiage (Tachnicolor Graphia Services, Mod Bete Center, Sioux Pelle, 80 57198] Spanors S. A. Langel) The yet latary scaler secondly map sompiled fine mannels. August)

The yet latary scaler secondly map sompiled fine mannels find astellite OMAGAT) deta oboutly framebles the map derived from POGO (roter oil) framebles the map derived from POGO (roter oil) fits Geochytical observatory) dete, through the considerably spectra of the cast derived and the considerably spectra of the cast derived by the cast derived before the cast derived have been as the latero Stale, and mubdice R-S testuran being to the Later Later from Hift Fystem. This is the cast of t HB INVITED PAPER HODEES AND WHITER RESOURCES DECISION-NAVING

tasource problems. Perilcinary lindings included:

1. Models sta most ofree used to suciar operarional management and small-state plemaing. They have less suctassible been integrated into comprehensive rives burin planning and policy making.

2. Although water segmants model can is satemaive at the federal layel, reordisated each sing ellorts have been rate.

3. While most states tutternily can models, many states would like to broaden their modeling sepabilities. Blowear, due to ilmited resources and puor information sheat to improve their capabilities.

4. There is a wide vatistion in the quality and utility of eater remoters models. Revever, loteranting sheat the quality or appropriate use of these tools is diffusit to obtain, and in many leatances coknown due to sack if model avaluation.

3. To the past, model development activities

model avaluation.

5. In the past, model development activities have recalled primary amphasis, without adequate attention to technology timefar and wast support. Attention to texticut(one) support, as wall as a problem solving approach, has been laching.

FERERAL RESEARCH SUFFORT FOR HODELS

Willtee E. Butther(Division ol Civil and Environmental Englosering, National Ericors Faundation, Weshington, O.C. 20550)

The use of water resources under it percently throughout the tederni Agenties somewhat with ester resources piscoling and management. Agencies with a specific settin mission, both use and develop earer temourses andels through ke-hease or settre earer extriction. Other agencies whose edeals of general reaserth such as the Sational Etheoca Youndation and the Office of Water Research and Technique through tessarth, product node

Many Important models have have produced by fadetel agancies. Some era aperial putpose, s.g. in the U.S. Army Corp of Engineers and STA Others are gaussel purpose and/or experimental.

Research has been targety responsible for the increase to relevance and currency of present necess avertishis and is proceeding to setend the tange and power of presently avertishis module.

HD INVITED PAPER THE BYTICACT OF WATER RESOURCES HOOLS: HODEL DEVELOPERS PERSPECTIVES

Jered Cohon (Beyerteent of Geography and Environments! Engineering, Johns Hopkint University, Beitimors, Maryland 21318)

HE INVITED PAPER SESSION OYEXYIEN

Y. I. Reinge, Director, Camber for Large Scale Systems and Policy Analysis, Case Mestern Reserve University, Cleveland, Okto 44106

Reserve University the service is to evaluate the efficacy of modeling is water resources focusing on the following expects and issuess focusing on the following expects and issuess (1) How responsive are these models to the needs of solving libter Resources and highest today?

(2) How tradities are these models for plosting, operational and policy decisions by local, state and federal agencies?

(1) Non cradible is the date bate!
(5) Are there coordingtion problems arong model developers and users, and how can tray be resolved?
(6) Are there codel maintenance problems, and how can they be solved?
(7) What tachmology transfer problems exist, and how should they be addressed?
(8) What training and addrational problems exist, and what should be our response?

The scheduling of this session coincides with the pignose release of a study report or the subject conducted by the Congressions Office of Jechnology Assessment.

VATER BALANCE AND PROSBING TIME AS VACTORS IN HID-WEST LAKE ACIDIFICATION

Oris loucks | The (atiltute of trology, ladianeoptis, 18. 46208)

AND RELEASE DURING SPAING MELT Dean 6. Jeifries |Lianology and Toxisity Sertian, Ontario Ministry of the Serironment, Sox Yil, Reviels, Ontario,

epre B.M. Priedmant

pulk deposition and snowpack scenamistion of e', Ca', MR1, SO, , MO1, and CI has has been researed so several locations in south-central Ontario. Parameter concestrations in integrated snowpack samples change over the course of the singer and ass commonly lower particularly SO, it has the porteagonding bulk deposition. Assessment of the snowpack profile suggests that the profess of property is suggested. Assessment of the snewpack protils suggested that the reduced concentrations occur through loss of ions by downward migration. Purshap periods of snowmest, struce concentrations suchibit off ineance relationships with discharge, depending so ion. Calrium and alkalinity concentrations ern seduced up to 10-loid during spring runoff, while \$0.000 concentrations remain openess; and \$1 lest cases up to 10-foid. The imput of \$6 associated with spring seit constitutes a significant portion of the potest annual \$6 loading supplied by their seturables the anny lakes; is executed. their secretaes to many lake is control operate. Consideration of Eq. /Mo; so Liou has slowed sessemes of the talette importance of the component of the etropy acidity in hulh deposition, the securach, and etters waters.

N27A INVITED SOCIAL TREMES AFFECTING DESCRIPTIONS THE CASE OF THE ARID WEST

Erm Flaches, Dapt. of Serkology, Coletade State University, Ft. Colline, Colesade

This paper excepts to describe secie! treade and developments seecelted with dry environments in the U.S. while addedsing conceptual sed exchanges to the lineages count the eldery deheted rencept of "describilization."

The unst srid stam between the Sierre
Brade and the 160th peridien is thatasterfe ad
by: | o| freelie servetame und petentially
strengin seviromental conditions | hi |
changing south explorement, resulting from
trid orbanisties, syrest, and industrialization which decimates the tist of "desercyfication" for intget segments of population;
| o| traposes to "desertification" which are
becoming quits complex or no intremental number
of interdependent bystems are offerted;
| d) procedive extraigles that are becoming part
of long-tange polisies tangeling a note bolistic
section transcraes emphasis note a shife from
'relais mesagement'; a "rish menagement;"
| o| o und (or a broader mobilization of localputtions and people to order to haccommists
policies | or resource statistics, a lientle
vagaria, and the uncertainty of future

Given the visiness of the fift West, the firsting typects, the economical integer, and first discrepantic effects, a bit shet understanties of estudial resources and in-linear linear terms of the rest. remote that ions within and restalls the restant section. Sectional files of conditions, and first same similitations of commissions of the restances, as seeded.

DISCUSSION ICCIC. WATER ATALABILITY FOR STYLETTC ICEL DEVELOPMENT, INTRODUCTION

Paule J. Stone | 0:01cm of Tachnology Assertament, Unified States (Congress, Washington, D.C. 20510)

H37A INVIDEO

DISCUSSION TOPIC: WATER ADDICABLE ITY 1CP SCATHETIC FUEL DEVELOPMENT, OVERVIEW Leo M. Essal (Maighe Water Engineers, Int., Denver, Colorado -80211) (Sponsor: P. J. Stone)

HITE INVITED

DISCUSSION TOPIC: WATER PEQUIPMENTS FOR SENTHETIC FUEL PLANTS

Harris Gold Water Partfiction Atmostains, Cambridge, Nata. 02142 (Spontor: P. J. Stone)

H37C INVITED

GISCUSSION COPIC: WATER AVAILABILITY FOR STATHETIC FUEL DETILOPMENT, DAIA Frederich A. Ellpatrick (USGS, Reaton, Virginis 27092) (Sponsor: P. J. Stone)

H37D INVITED

Gerald Seferall (U.S. Weter Resources Council: Mashington, D.C. 2003) [Sponsor: P. J. Stone]

HISTS INVESTED

RITE INVITED

DISCUSSION TOPIC: WATER AVAILABILITY FOR SYNTHETIC FUEL OLYELOPMENT, PEGIONAL PERSPECTIVE

Harney Banks (Casp Bresser Felde, Inc., Belmont, Esitformie 940n2) (Sponsor: P. J. Stone)

DISCUSSION TOPIC: WATER AVAILABILITY FOR SYMBETIC FLEE DEVELOPMENT, INDUSTRIAL PERSPECTIVE

MITE INVITED OTSCHES INT TOPIC: WATER AVAILABILITY FOR SYNTHETIC FUEL DEVELOPMENT, CASE STUDY OF THE TELLOWSTONE PLYER BASIR

Constance II, Boris (University of Michigan, Ann Arbor, Michigan 48709) (Sponsors P. J. Stane)

(ISPA INVITED

THE BEED FOR DAYA TO RELATE DELECTED;

A series of three books on drinking Wirnt and Realth have been published by the flational Academy of Sciences in the past four years and a lough volume is in preparation. The insertance caches requised for the preparation of these volumes have brought to our attention on these volumes have brought to our attention mayoral serious gaps in the data required for making sound decisions concerning the relationship between the premours of cuminations in drinking waters and health. Thuse deficiencies are superior, date flow midding, and evaluation of five indications on the serior of the consequences of ingesting contaminents. This paper will call attention to expecting deficiencies in these and other areas.

SEARAT EAR BESPONSE FROM WATER BESINGES

Bruce J. Slaverhard
A. T. C. Chang (both at: Earth Survey
Applications Division, NASA/Goddard
Space Flight Center, Greenbell, Rd. 2df/81
Andrew J. Blancherd Heres ASN University,
Tanna Basic Teams 18461

An infeled threatigation of the Seeset synthetic aporture rajar [SAS] date was directed course extinction of not moticure; vagetation type, surface roughnest due to rillage and file, director trusher forces rampy, the SAS temporals was validated with a series of dits and file, and 1-band castequeste flow in the MASA C-500 atterest. Soil motitude to the surface 15 cm from fields of mile, allatin and bete soil produce similaring to the soil produce similaring the soil better the both system. Has agricultural vagatarion van effectively transgarent and was proctured by the streeting the course of the surprised for the streeting the surface for the su transparent and was processed by this tracelength. C-in produces on-explicitally high returns, however, there was evidence that fillegs enugheess could be derected through the corn cancy. Sorest causy in cultrast produces suffered seturns except. when the forest floor is liveded. Sleeded intest produced 4 to 4 db higher scattering coefficients than non-Housed lovest les both the SAN and watercourse. There was no distributed alliterates in response from confer and doubtloom lovest canapp. Echauconfire and destable as lover carrys. Cfrom-lar stillage patheters were used to illustrate the look angle dependence of row direction effects as the refer rejorn. Soughness due to stillage can produce as now he as 12 db becrease to vature, the Seasar SAS produced valuable resonanting and to some instances would enable only marris of parameters thus are not familial with any other faces.

STA IF C OFFICE SHEET ESTH STATES STRENGTIC APPREURE

R. T. Bill acf D. A. Rathicck Ilicia: 5-ton a Conter, Indepents of Manhington, with Françoid bas Mf. Scattle, MA 19105)

Impraintment by a winitetic agenture tader on SYA-TAL hive been used to weakness was too displacements over a three des interval in October 18th. The data relate the roughts stong a line and are quite designating a ba systemoter a distance of 661 to. The bittle county are to ut tounty filterery. Cimple ment etcors grow with distance Carp shore lecroing ne litter as 3 km. The graph of displacement versus distance her or actional discontinuistes of several bil meters. Displacement discontinuities are accurate to \$ 0.01 Sm along track and 32 of their magnitude

PERC

ITTUR FOLKE VANGERING

I k. Function Editort of Physics. The University, Arm total upon Tyre, API TRU, England

Foliat barbating, her recision callen with terrori Co the ania of totathon porura if mass is relativistate on a plenetray sody and it is interior flows by tells state crosp order small stress differences. This process which he expected to have occurred during the early history of the Mode and Mars. Evidence for its citativista on the Mode and Mars. Evidence for its citativista on the Mode and Mars. Evidence for its citativista on the Mode and Browland by the place and the majorite anomalies described by the Apollo 55 and 15 subsacchittes. The dominants of the citativista is nobacchittes. The dominants of the Citativis love in its goalulated little turns care laids to the ensumption of an antal dipole field. Stong arguments asias for the processing the direction of the citativist as the anchem lunar flaid direction. The pole goals ten contemporaling to them bell mass care ctust as the ancient lunar field directions. The pole posicions corresponding to them fell into antisodal groupings along three different area, inserpreted as representing three different ages. Folar wandering is interpreted as teing caused by the less great impacts and their issue theday with laws to groduce the masses.

THE TIS VELOCITY PORCERSOR: A DESIGNATION FROM A STOCKUSTIC MODES OF PRACTICATION

4. Sentret (Venesselen Formiattes for telamoto giral breestch - Specialo Idel, Caracae 10t0.

tto fastic Percurtation Theory is explied to the orrelation of classic tedy wasen in a randomly erratilist section. For the P and SV nodes there id note only atterwated obtains. These effects are the result of the contribution of all orders of a street parameters of the relative way. On a street parameters of the relative way as advertigate autocorrelation of the fractional tile latter of the consistent in the shear adults. On the street and integral make I, he raises to be larger than the way as a street of the first of the street of the first of the street of

and, to principles, the retto ref. for a second receive special regions to the magnetic second retto an experience of the magnetic second retto retto

SOME CONCEPTS ON THE PERATEMENTS OF TRAVEL THE MICHGLIZE, MAGNITUDE RESIDUALS AND OTHER CHONTELCAL PARAMETERS

Wichard J. Shore Department of Earth and Planetary Releasest, Johns Mophine University, Majtimore NO 832241

many memore mayo supported that verifying correlations and of briven various parameters. These operated has no normally attributed to the physical properties of the low velocity nose and opportunes parts of the mantis. To support of body wave ettemphism studies, generated would like to devalue ladicate. Many authors have corrected that vertibulds would like to develop ind

relative differences to ettendation at widely spaced stations.

Heavy smarts of travel time recidents. Regnitude reciduals and In velocity, wate tabulated for 90 columbs stations from pub-Aughitude Televale and in Transcript on published sources. Seat flow meanatements were obtained from the 1816 MOAR Beridride Data Base and quoid velves were setracted from a 1979 NASA setalize quoid. Evatostion of the data influences a tinear correlation coefficient let of 0.7 for body wave amendated residuals and Pa velocity. Less significant coersistions [v] of 0.7 for body wave amendated residuals of the proof of the coefficient let of 0.8 for daily are noted between magnitude residuals. En relocity and the quoid with travel size residuals, ead between heat flow and I'm velocity ir - 0.4. Neet tion to poorty correlated with amplitude residuals, trevel time credicate, and goodd level. Even though the strongest correlation was observed between magnitude residuals and Pa velocity, magnitude residuals could only he predicted with 795 coedidants los a givan in velocity to 0.74 semitude units. Therefore, the ene of alternative grouphysical parameters to predict magnitude residuals at a particular station does not appear ecurate smouth to significantly improve individual station wearresence.

HA76A

OPTICAL AND RADAR COLLABORATIVE RESEARCH 18 ALASKA AND GRISHLASD

J. V. Marienther. Jr. P. 1. Says . 1. Sagy (att at: Opsca Physics Sessenth Laboratory, University of Richigan, Ann Arbor, Michigan 48100)

Collabora Cles tasserch barwem opcioni Instru mentation and the intoherent scaler cedar pro-wide valuable complementary dete shout the state of the stoneghere. detical mean such as interof the stoughers. dgClest meens such as interference formaters, spectrophotomesters, and interference filter photometers may be used to sequere themospheric neutral winds, neutral imperotures, and sirglow or aurmes in surface brightnesses as a function of time or direction. The reder provides dark at a function of height for innempher wartables such as election decalities, ion and election semperatures, and ton drifte also as a function of time of direction. The two sace of information provide a unique foundation for aerosatest studius of auroual chadery and dynamics. Topical areas feeduring such collaborative research in Alashe fou the liss ten yeste with be reviewed, and our plans for an opeliaticality at Sondre Riccaljox of proposed to the Mattonal Science Foundation will be discassed.

STRULTINGOUS MEASUREMENTS OF VLS (SANSHISSIORS ER THE RESONDERE AND SCRATOSPHERS

C.R. Cornish, S.P. Sieft, S. Yowell, S. Sincoar, M.C. Relief (School of Electrical Engineering, Cornell Conversity, [theos. 27 [165]] S. Molevoth [The Serospase Corporation, P.O. See 92359, Los Angeles, CA 90009]

Continuous VIF eignain From carth-based Cransmitters were received beluces did in and 98.2 in by a Wine-Orion counting rocket and at 30.2 in by a Wine-Orion counting rocket and at 30 km hg a high efficacy counting rocket and at 30 km hg a high efficacy counting rocket and at 30 km hg a high efficacy and parformed three orihogonat wave measurements using aymentrio doubte probe afformed field escapes epaced 5.5 maters apart. It three channels resolved broatband elgals, lor which islowed recovery considerations libed their examens iscapeancy responses to 20.0 kms, 48.6 lits, and 40.5 lits. Many discrete transmissions vaus received of which the OhioA and PAI insmellers here so far been identified. The balloon, with double probes spared 3 meters apart, when the continuous deat store 2115 to 3115 UT at 30 km silliude to a fAlter chemist centured at 11.8 KS. Toe resolved affairs, which we believe crigionised at the SRA Transmitter to knion, was econolated as the balloon apid apriced at 21 seconds and Pravides e "baseline" power accountable. At this sums frequency, the rocket seconds and pravides e "baseline" power accountable. At this sums frequency, the rocket seconds and pravides e "baseline" power accountable. At this sums frequency, the rocket seconds and pravides e "baseline" power accountable of the seconds and power level should be a start of the allowed power level after the laghed of the electrical and appear to the second and power levels to light of the electrical and appear to the second and power level to light of the electrical and appear to the second and power levels to light of the electrical and and appear to the electrical and ap doubleg. We towastipele these received power levele to light of the electuical characteristics

PARABOLIC DISSOLUTION RINETICS - AN ARRIFACT OF PRECEPITATION?

G. 8. Holdren, Jr. and J. E. Adams [Dept. of Geological Sciencec, University of Rochester Rochester, N. Y. 14627]

The reta limiting clap for the dissolution of leidcpar and other priestry silicate witherels is thought to be a earface controlled resation process. According to this model, the rates of discolution for these winerels should be constant through them in dilete aqueous adjusted under conditions of sonstant solution pt, almost surface area and attring rate. This prediction is in confict with a large body of experimental reidence which suggests that discolution himselfes of these minerals folion a parabolic rate law.

Otal have been called the which suggest that this discrapancy may really, in part, from the nonequilibrium precipi sition of Ampphose alumineslifectes which occurs during the course of discolution appears its. Experiments have performed to observe it is kinetics of formation of amprhous pracipital is under conditions which are similar to these employed in mineral dissolution atudies. Concentrated (0.05%) Almost in the containing solutions were slowly and continuously added to 1.5 to 2.0 liters of beffered aqueous solution (ph ~ 6.1). The The rate limiting clap for the dissolution d

continuously isoded to 1.5 to 2.0 liters of beffered aqueens solution (pH - 6.1). The addition rates were much that idual Al and SI concentrations increased linearly with line. Results todisate that the vates of formation of the emergency always of an experiment, producing apparent addition rates for silicon. These results strongly suggest that the non-linear dissolution timetics obcarred in provious aimeral dissolution timetics obcarred in provious enterti dissolution timetics obcarred in provious aimeral dissolution strongly suggest that the non-linear dissolution fractions which occur in those systems. Also, the results suggest that the actual dissolution processes need not be affected by and are taking place independently from the precipitation reactions.

An Overview at National Science foundation Programs in Astronomical Assemptoric, Exch and Ocean Sciences

1450 M. Gradt Grass (Otatelon of Ocean Reference | till Edward P. Todd (Division of Poter

Program:
Program:
It's Peter O. Wiltnist (Division of General Drift Had Programs)
ISIO F, Robin trait (Division of Earth Sciences)

ISP, through the Directurate for Astronomical, Atmaspheria, Sarth and Beans Beloness (AAEO), is a major source of separat for resuarch in the coeth related selected and introducy. The AAEO Birecturate improve the patients instrumental observatories, the Mailenat Contor for Atmaspheric Research, the exacest float, the U.S. Antoropheric Research, the exacest float, the U.S. Antoropheric Research, the exacest float, the U.S. Antoropheric Research, the categories float, the States of the AAEO Divisions of Atmospheric Sciences, the Division of Police Programs and the Division of Possa; felling Programs will discuss the divisio of recease programs and possable distrumental programs.

Revised and Additional Abstracts

yes REVISER

ORDER-0150ROFF EIRETICS IN TERROMAGNESTAN STOTCATES, AND THE COOLING HISTORY OF ROCES.

La many Ferromagnesian sllicates, Fe²⁺ and Mg are disordered over two or more nonequivelent crystallographic sites. The temperature 1q, at which the observed ordering state of a natural srystal has been quenched, depends on the rate of cooling of the host root (Tq < the natural srystal has been quenched, degenos un the reta of cooling of the host roc! [Tq < the texperaluse of apparent oquilibrium ul tas queeched ordering state; Solution for Tq hes been obtained for the non-lieuar cooling model, 1/1-1/1 + c[tlme], from Mueliar's (1968) sinutic Treathest of intrassystalline exshange. Musesical method and program have been developed to calculate the change of cita occupacy, X, as e function of T (which is a function of the in cooling system) for any nock cooling model. The cooling site constant cas be was admitted to the in cooling site of the intervention of the cooling site constant cas be varied until the salsulated X vs. I relation reproduces the observed quenched state. The model hackbeen applied to a number subural pyroxema and (a-poor amphiboles. The bleatic data for orthopycorae by Virgo and Marinar 1969) and dessance [1980, Agil Spring Meating) have been applied to the data for latracrystallian distribution of Ta and My for a sinapyroxema sacola from timberlita (McCallister, et. al., 1976, Amas. Minasi., 6]; asspired published has been applied to the data for latracrystalliand to sinapy blocking a cerula musher of the cital side of the school of the sacola of the intervention of the school of the intervention of the school of the school of T, and the school of the school of T, and parathesially 6 days and one year, respectively. For the cooling of the scene of the hoot kimberlite.

GAA RLVESED

ALTERNATIVE PILTREING TECHNIQUES APPLLED TO THE EARTH'S GRAVITY SIELD Christopher Jahati (Department of Geodes to Science, The Oble State University,

Welt known filters to Pourlar special analysis, such as the roctangular. Chuselse, and Hanning Filters, are adapted for data on a sphere. The different emoching propeuties can best he atedied by examining the corresponding fraquency response functions (t.s. the speciar of the filters). The tow-pass filter most olten need on grevity data is the rectangular (or fellians) litter. However, its spectrum has relatively large sidelobes; and therefore, this filter passes a considerable part of the appear and of the gravity spettrum. The aphetical edeptations of the Gaussen and Remning filters are most efficient in suppressing the high-tequency somponents of the gravity Reld eines their frequencies are the high frequencies util no, or small, eldetohes.

Selsmology

THE EFFECT OF PURIORE COMPLICITY ON ESTIMATES OF STREETS RELEASE

John hostwright, U.S. Geological Survey, Mento Park, CA 94025 (crossored by #. Archuleta)

Ihe shear wever radiated by sight multiply ratorded efterchocks (3.6 M_c 4.9) of the 1975 Orovitle. California, earthquals have been emplying for a variety of time-domain and specified heafterweeds. The relative complexity of the value was totally awaidoms is quantified as estimate the heafterweens. The relative complexity of the value average rufture whose type and thereby bound the average rufture whose duration, and pulsa duration are inverted for extimates of the course size. The inverted for extimates of the course size. The inverted for extimates of the course size. The inverted for extimates of the course size the rupture ghose try. The cropprision of source size extinates indicates that for complex sarthouses he some frequency is more sencitive to the subsevent size than the overall uvent size.

Five different astimates of ctrees release are considered over the oats sat. The apparant sires, the dynable stress drop and a stracs drop ectivated from the rms accularation of the sher was arrivals give robust artimates (85-250 barc) which sorrelate remarkably well across the aight events. The static stress drop datermined using the rupture areas calculated from the pulse durations correlates adequately with the three dynamic stress drop estimates, while Brune's asilmate of static stress drop correlates poorly with the char estimates. In general, the estimates of ctreit stress drop correlates poorly with the other estimates. In general, the estimates of ctreit stress drop correlates poorly with the other estimates. In general, the estimates of ctreit stress drop are less reliable liben the estimates of ctreit stress drop are less reliable in the estimates of the correlates and years.

SPR: Magnetospheric Physics

SETUDETAN ELLONETOLC RADIATION OBSESTED BY NOTAGES-1 RELO TITAR

H. L. Kutser
H. d. Decen | Dath et MASA/Goderd Space Flight
Cuncer, Laborssorp for Introcorrestriat
Physics, Planutery Magnutoepheree Branch,
Greenbelt, Berglene 207711

The radio solution observed at 56 hRt when the Yoyager-I spacecraft flow past Titse has been Yoyager-I spacecraft flow past Titse has been proposed as emerging from Illan Itself. We sere ease teed the observations made by the Yoyager-I and 2 Flooglery Radfo Astronose instruments during this period. Both openedral detasted strong saleston over the head from about 80 kHe so 260 kHa. Stone Yopager-2 was then some 1.8 SE from Satura, we were able to compare the essawed eighal strangthm eith liose expanded from a Titen radio source. Assweing both spacecraft could equalty wait view the source, we would expect the eighet to be some 96 to 18 tepher se chemyad by Yopager-2 compared with Yoyager-I. In fact, the sessured signal difference I shout y 48 which is should wantly that expected if the source were at Satura rather than Titen. Therafore, we consided that the setzeton defeated by Yoyager-I neer Titen singuished and not a new radio gource.

MAGNETOPAUSE HODELAND, USLAG 14EE-A EMERGETIC PARTICLE DISTRIBUTIONS

I. M. Speiser (NOAA Space Environment Laborators, Soulder, CO 80303)
Ps J. Williams
(Alox or Depr. of Assrc-Gamphyelou, University of Colorado, Roulder; CO 80309);

Leveral magnetopajme ittandings spå observed on the imbound pass of ISER-1 on Founder AO, 1977. The observed three-dimensional entractic loc dis-tribution functions (24-10 keV) are studied in the segmentations, the magnetopasse and spaceto-chants. Selected magnetopheric and cheats shautomants are used to intelnities, particula-manuscounts are used to intelnities, particula-

orbite to a simple one-dimensional quant-static model. Proton orbits are followed from the magnesosphere into the enemies and e modeled shaut diestifuntion to coostructed, uning Licertia's theorem, which is then compared to the observations loss an invariant magnetic lield companies and for sampanies aspects lield companies and for sampanies elected lields less than about 1/2 my/m. This codel seems to work both for "first transfer every" and neighboring "quest-srapped" shouth diastifuctions, imptying that the region of open field times to the sheath map be broader, not quite as freat, as proviously shought. Yesona of different engions of the magnetopouse. This result, coupled with some of the conjectors that tengencies and post to the conjectors that tengencies and leafs above our upper limit may exist over localized regions of the magnetopouse.

Geophysical Year

(Boldiace indicates meetings eponsored or coeponeored by AGU.)

1981

July 21-23 Chapman Conference on Spatial Variability in Hydrologio Modeling, Fort Colline, Colo. (Meetings, AGU, 2000 Florida Ave., N.W., Weshington, DC 20008.)

July 21-30 21st General Assembly of IA-SPEI. London, Ontario, Canada. (A. E. Beck, Department of Geophysics, Univ. of Weslern Ontario, London, Ontario N6A 5B7 Canada.)

July 27-30 Eighth International Symposlum on Urban Hydrology, Hydraution, and Sediment Control, Lexington, Ky. (Don J. Wood, Department of Civil Engineering, 209B Anderson Hell, Univ. of Kentucky, Lexington, KY 40506.) Aug. 3-15 IAGA Fourth Scientific Assem-

bly, Edinburgh, United Kingdom. (B. R. Leelon, Institute of Geological Sciences Edinburgh EH9 3LA United Kingdom.) Aug. 4-7 International Conference on Enst gy Education, Providence, R.I. (Donald Kir-

wan, Conference Chairman, Office of Enargy Education, Univ. of Rhoda Island. Kingaion, RI 02881.) Aug. 8-15 Symposium on Verletions in the

Global Water Budget, Oxford, United Kingdom. Sponsors, ICCL, IAHS, INQUA. (Prof. R. E. Newall, Department of Mateorology, 54-1520, MIT, Cambridge, MA D2139.1

Aug. 9-18 International Congress of Survayors, F.I.G., Montreux, Switzerland. Sponsor, Fédération Internationale Das Geometras. (Amarican Congress on Surveying end Mapping, 21D Little Falls Street, Falle Church, VA 22046.)

Aug. 10-14 International Conference on Basement Tactonics, Oelo, Norway. Sponeor, Norwagian Petrolaum Society. (Roy H. Gabrieleen, Department of Geology, Univ. of Oelo, P.O. Box 1047, Blindern, Oelo 3 Norway; or Don L. Baara, Department of Geology, Fort Lewie Collaga, Durango, CO 81301.)

Aug. 10-14 Water Forum '81: Technical Stele of the Art Exchange, San Francisco, Callf. Sponaors, Amarican Society of Civil Engineere, Irrigation and Dreinage Divielon, Committee on Drainege. (P. M. Mey-ere, 509 North Roosevell Blvd., Apt. D-106, Falls Church, VA 22044.)

Aug. 10-19 20th General Assembly of the International Union of Radio Sciance, Washington, D.C. (R. Y. Dow, National Academy of Sciences, 21D1 Constitution Ave., Washington, DC 20418.)

Aug. 17-28 Third Scientilic Assembly of IA-MAP with Extraordinary General Assembly, Hamburg, Faderal Republic of Garma ny. (S. Rutlenburg, NCAR, P.O. Box 3000, Boulder, CO 80307.)

Aug. 17-1B Open Symposium on Methemailcal Models of Radio Propagetion, Washington, D.C. Sponsor, URSI. (J. R. Wall, Bidg. 20, Electrical Engineering Department, Univ. of Arizona, Tucson, AZ 85721.)

Aug. 17-22 Ninth Internstional Symposlum on Earth Tides, New York N.Y. Sponsore, IAG, IUGG, Columbia Univ. (J. T. Kuo, 928 S.W. Mudd, Columbia Univ., New York, NY 10027.)

Aug. 18-21 Second Blennial Conterence and Exhibition of the Australian Society of Exploration Geophysioleta, Adelaide, Son Australia. (J. Haigh, Conference Chairman P.O. Box 42, Unley, South Australia 5061

Aug. 20-21 Second International Sympoalum on Computer-Aided Seismio Analysis and Discrimination, North Dartmouth, Mass. Sponaors, Electrical Engineering Department, Southeastern Massachut University, IEEE Computer Society, IEEE Acoustics, Speech and Signal Processing Light Society. (C. H. Chen, Electrical Engineers Ing Department, Southeastam Massechie setts University, North Dartmouth, MA 02747.)

Aug. 24-29 . International Symposium on Management of Geodetic Data, Copenha gen, Denmark, Sponeors, IAG, the Daniel National Committee of IUGG, Geodaeisk inetitut. (C. C. Techerning, International Symposium Management of Geodelic Data Geodaailek Institut, Camlehave Alle-22. Charlottenlund DK-2920 Denmark) AUG 24-29 Eighth Annual Meeting of the

European Geophysical Society, Uppsels, Oct. 14-18 Third Surveying and Mepping Sweden. (C.-E. Lund, Chairman Local Or-Colloquium for the Petroleum Industry, narizing Committee, Inetitute of Solid in Physics, Uppeala University, Box an Petroleum Association. (Liz Hampton, Canadian Petroleum Association, 1500, Aug. 25-27 The Royal inellitution of Chartered Surveyore Centenary Celebration,

558, 22 Uppsala, Sweden.)

Church, VA 22049.)

London, England. (Representative Rad-

Mekl, American Congress on Surveying

Aug. 28-Sept. 9 Arc Volcaniem Sympo-

sum, Tokyo, Jepan. Sponeors, Volcano-

logical Society of Japan, IAVCEI. (Delauke

Shimozuru, IAVECEI Symposium on Arc

Velcanism, Earthqueke Research Institute.

Univ. of Tokyo, Bunkyo-ku, Tokyo 113 Ja-

Aug. 31-Sept 2 Third Internetional Collo-

gulum on Mars, Paeadena, Calli. Spon-

sors, NASA, Lunar end Planetary Inelliute,

Division of Planetery Sciences of the AAS.

(Conwey W. Snyder, Jel Propulsion Labo-

Aug. 31-Sept. 5 Symposium on Geodetic

West Germany. Sponeor, IAG. (Deulache

Geodätische Kommiselon, Beyerlechen

Akademie der Wiesenschaften, Meratali-

Sept. United Netions Symposium on Water

Management in Industrielized Areas, Lie-

ben, Portugal. (Chairman of the Executive

Committee, International Symposium on

Water Menagement in Industrial Areas,

Sept. 7-12 Third International Symposium

Sponsors, International Commission on

Snow and ice, international Glactological

Society. (Institute of Polar Studiea, Ohio

State Univ., 125 S. Oval Mell, Columbus,

grammetry-American Congress on Survey-

345 Middlefield Road, Mall Stop 31, Manlo

Sept. 13-17 Nelional Water Well Associa-

ion 33rd Annual Convention and Ground-

Kanses City, Mo. (NWWA, 500 Wast Wil-

son 9ridge Rd., Worthington, OH 43085.)

550. 16-18 Oceans '81, Boston, Mase.

AGU. (R. Nagla, Publicity Menager, Ray-

freen Company, 141 Spring St., Lexing-

Sex 17-18 Midwast Meeting, Minne-

Minn. (Meatings, AGU, 2000 Florida Ava., N.W., Washington, DC 20008.)

Sept 17-19 Pacific Northwest Rs-

glonal Meeting, Elleneburg, Wash.

of Geology, Ellenaburg, WA 88820.)

(Bob Bentley, PNAGU, Cantral Washing-

Sept. 20-22 National Weter Well Associa-

fon 34th Annual Convention and Exposi-

ton, Atlania, Ga. (NWWA, 50D Weel Wil-

son gridge Rd., WorthIngton, OH 43086.)

Sept. 28—Oct. 10 NATO Advanced Study

institute on Chemistry of the Unpolluted

and Polluted Troposphere, Corfu, Greece.

Y. Jaeschke, Center of Environmentet

Pretection, University of Frenkfurt, Robart-

Wayer-Str. 11, 5000 Frankfurt/Main, FRG.)

0d. 8-8 International Conterence on Time

Series Methods in Hydrosciencee, Burling-

ton, Onlario. Sponeora, National Weter Re-

search institute of the Canada Centre for

Mand Watere and Water-Reaources

Branch of Ontario'e Minietry of Environ-

ment. (A. El-Shaarawi, Aquatic Physica

and Gyetems Division, NWRI, Canada

Centre for Inland Waters, P.O. Box 5050,

Builington, Ontario L7R 4A8 Canada.) Od 7-9 John Muir Geophyaical Society'e

Fourth Nonannual Meeting, Lake Arrow-

head, Calif. (M. McNuil, USGS, Menio

Oct 11-14 Coastal Society's Seventh An-

Nest, Coasial Society Conference, De-

Univ. of Rhode leland, Kingston, RI

Partment of Geography and Marine Affairs,

Oct 11-15 51st Annuel International Meet-

hg of the Society of Exploration Gaophyel-

dels, Los Angelas, Calif. (William L. Baker,

ischnical Progrem Chairman, c/o Chevron

Oi Field Research Co., Box 448, La Ha-

Oct. 12-18 Third International Ocean Dia-

Posal Symposium, Woods Hole, Mass.

Sponsor, Office of Marine Poliution As-

Energy Conference, Baton Rouge, La.

Sponsors, Louisiana Geological Survey.

Capariment of Natural Resources; Energy

Programs Office, Louisiana State Universi-

Y; U.g. Department of Energy. (Ann Bach-

man, Conference Coordinator, Energy Pro-

State Univ., Belon Rouge, LA 70803.)

Od. 13-19 Division of Planetary Sciences

of the American Astronomical Society An

Tital Meeting, Pittsburgh, Pa. (B. Hapke, Dept. of Geology and Planetary Science, 321 Old Engineering Hall, University of Pittsburgh, Pittsburgh, PA 15280.)

sessment, NOAA, (I. W. Duedall, Merine

Sciences Research Center, State University

ly ol New York, Slony Brook, NY 11794.)
Od 13-15 Fifth Geopreseured-Geothermal

in, Tex. (N

Park, CA 84025.)

rual Conterence, G

Ma, CA 90631.)

ton University, P.O. Box 1000, Department

Sponsora, Marine Technology Socialy,

IEEE Council of Oceanic Engineering

*aler Technology Education Seesion,

Sept. 8-12 American Society of Photo-

ing and Mapping Fall Convention, San

Francisco, Calif. (L. W. Aggers, USGS,

Park, CA 94025.)

W. MA 02173.)

on Anterotic Glaciology, Cotumbus, Ohto.

Particulase Water Resources Association.

COLNEC, Av. do Brasil, 101, 1799 Lisbon,

Networks and Computations, Munich,

ratory, Pasedena, CA 91109.)

platz 8, D-8000 Munchan 22.1

and Mapping, 210 Little Felle Streel, Fella

Oct. 19-22 Earth Impact Conference. Snowbird, Utah. Sponsors, Luner end Road 1, Houston, TX 77058.)

Oct. 22-24 Fourth Conference on the Physics of the Jovian and Batumien Magnetospherea, Laurel, Md. Sponsor, NASA. (S. M. Krimigis, Applied Physics Leboratory, Johns Hopkins Univ., Laurel, MD

Oct. 26-30 Symposium on Quaternery Land-Sea Migration Bridgea and Human lines Commission of the International

Oceanic Conlerence, Idlewood, Celli. (R. Michael Laure, EPOC Secretary, South-92037.1

Beach, Dreg. Sponeor, Estuarine Re-seerch Federation. (Jey F. Watson, Treasurer, USFWS Suite 1862, 500 N.E. Multnomah Street, Portland, OR 82232.)

Nov. 2-8 International Conference on the Venue Experiment, Sen Francisco Bay Aree, Calli, Sponeor, NASA. (Dr. Lawrence Colin, Amea Raseerch Center, Moffett Fletd. CA 94035.)

Nov. 8-11 Special Conference on the Mechanical Behavior of Salt, University Park, Pa. Sponsor, Rock Mechanics Leboratory. Department of Mineral Engineering, Pennsylvenia State University. (H. Reginald Hardy, Jr., Rock Mechanice Laboratory, Room 117, Mineral Sciences Guilding. Pennsylvania State University, University Park PA 16902.)

Nov. 9-20 Second Symposium on Geodeay In Africa, Neirobi, Kenya, Sponeora, IAG. IUGG Local Committee of Kenya, IUGG Committee on Advice to Developing

Nov. 30-Dec. t1 43rd Session of the Inter-national Statistical Instituta, Buanos Alras, Argentina. (Jim R. Watits, IBM, Rasearch Division, Box 219, Yorktown Heighta, NY 10599; or G. S. Watson, Bernoutil Society for Mathemetical Stetistica and Probability Department of Statistics, Princeton Univ., Princaton, NJ 08544.)

Dec. 3-5 Topical Conference on the etary Institute. (Rift Meating, Projecta Office, Luner and Planetary Institute, 3303 NASA Road 1, Houston, TX 77059.) Dec. 7-11 AGU Fall Meeting, San Fran-

cleco, Calli. (Maetinge, AGU, 2000 Florida Ave., N.W., Washington, DC 20009.) Dec. 18-19 Annual International Meating of the Working Group on Mediterranean

1952

Jan. 11-14 Bymposium on the Understand-Ing of Hydrotogic Processes at the Basin Scale, Caracas, Venezuela. Sponsore, Universidad Simón Bolívar, IAHS. (Ignack Rodriguez-liurbe, Universided Simon Bollvar, Apartado Postal 80.959, Ceracae

Feb. 6-12 Third International Gaodatio Symposium on Satallita Doppier Positioning, Las Cruces, N National Ocean Survey, AGU. (Richard Peat, Delenee Mapping Agancy, Hydrogrephic/Topographic Center, 8500 Brooks Lane, N.W., Washington, DC 20316.) Feb. 16-19 Ocean Sciences: AQU/

ogy and Oceanography Joint Meeting, San Antonio, Tex. (Maetings, AGU, 2000 Florida Ave., N.W., Washington, DC 20009.)

Mar. 24-27 Conference on Eerthquake Hazarde in the Eastern San Francisco Sey Area, Hayward, Calif. Sporisors, USGS, Easi Bay Council on Surveying and Mapping, Calli. Div. of Mines and Geol., Woodward-Clyde Consultants, Calif. St. Univ. et Hayward. (Sue Hirschfield, Dept. of Geo-

Apr. 11-18 Penrose Conlerence on Anlarc-

Banff, Alberte, Canade. Sponsor, Canadi-933 Sixth Ave., S.W., Celgary, Alberta, Canada T2P 2Y5.)

Planetary Inetitute, National Academy of Sciences. (Earth Impact Conference, Luner end Planetary Institute, 3303 NASA

20810.)

Occupation of Submerged Ccestilnes, La Jolle, Calif. Sponeore, Qualemary Shore-Union for Qualernary Research, Scientific Committee of the World Confederation of Underweler Activities. (Pairicia M. Mas-lers, Scripps Institution of Oceanography, A6-012, La Jolla, CA 92093.)

Oct. 29-31 28th Annuel Eastern Pacific weet Fisheriee Center, NMFS, La Jolla, CA

November 1-6 Sixih Blenntat Internellonat Estuerine Research Conference, Gleneden

Countries, Airican Association of Cartography. (R. Omandi, Survey of Kenya, P.O. Box 30049, Nairobi, Kanya.)

Processes of Planatery Rilting, San Francisco, Cellf, Sponaor, Lunar and Plan-

Ophiolitas, Florence, Italy. (Luigi Becca-luva, letituto di Petrogralia, Via Gramsci 9, 43100 Parma, Italy.)

Mex. Sponsors, Delense Mepping Agency,

ASLO (American Society of Limnol-

Mar. 22-26 International Bymposium on Hydrothermal Reactions, Yokohama, Japan. Sponeor, Tokyo Institute of Technology. (Shigeyuki Somiya, Research Laboratory of Engineering Materials, Tokyo Institute of Technology, Negatsute, Midort, Yokohama, 227 Japen.)

logical Sciences, California State Universily, Hayward, CA 94542:)

tica, Shenandoah National Park, Va. Spon-sor, GSA, (lan W. D. Dalzell, Lamont-Do-

herty Gsological Observatory, Columbia University, Palleadee, NY (0964.) April (9-21 Cordilleren Section, Geological Society of America and Salsmological So clety of America Annual Meeting, Anaheim, Ceilf. (Nelt Maloney, Earth Science Department, Calliomia State Univ., Fullor-

ion, CA 82634.) April 27–28 Chepman Conjerance on Reinfait Rates, Urbana, III. (Meelings, AGU, 2000 Florida Avenue, N.W., Wash-Ington, DC 20009.)

May 3-7 14th Internstional Liège Collegulum on Ocaan Hydrodynamlos, Liège, Belgium. Sponsois IAPSO, Unesco Marine Sciences Division, EGS, Intergovernmentel Oceanographic, AGU (Jacquee C. J. Nihoul, University of Liège Mecanique des Fluides Gaophysiques-Environment, B6- Sert Titmen, B-4000 Lièga, Belgium.) May 7-20 Generel Meeting of IAG, Tokyo.

Japan. (I. Nekagewa, Geophysical Institule, Kyolo University, Sakyo ku, Kyolo 906 Japan.)

Mey 10-12 Fourth International Conference on Planning and Menagement of Water Resources for Industrial, Agricultural, and Urban Use, Merselliee, France. Sponsois, Commission Europáenne Mediterranéonne de Plenilication des Eeux (C.E.M.P.E.), Sociaté des Eeux de Marsoille (S.E.M.). lhe Bureau de Recherches Géologiques et Minièrea (B.R.G.M.), Centre de Formation Internationata à la Gestion des Reasources en Esii (CEFIGRE), UNESCO, Commission des Communaulés Euro péennes, Associetion dos Hydrogóologues (AIH). (Socroteriet de la Conforenco, So cleto des Eaux de Moisoillo, 25 iuo Edouard Dalanglado-13006 Morselllo Frence.)

May 17-22 International Solor-Terrostrial Physics Symposium, Oltowa, Onlario, Cenada. (Profassor Llu, University of Illinois Urbana II 8t801.)

May t7-June 3 24th Plenary Meeting of CDSPAR, Ollewe, Ontario, Conndo. (T. W. McGrath, Exacutive Mombor, Local Organizing Committoe, XXIV COSPAR. Conference Secrotarial, National Rosonrch Council, Ottawa, Onlario KtA OR6. Cana-

May 23-29 Eastern Contenance on Writer and Energy: Technical and Policy Issuos. Pittsburgh, Pa. Sponsors. ASCE, Loaquo ol Woman Voters, Council of State Gov emmanis. (F. Kilpeinck, USGS Natiunal Canter, Mail Stop 414, Reston, VA 22092.)

May 25-28 Symposium on the Com-

poeltion of Nonurban Troposphera, Willamsburg, VA. Sponsors, AMS, NASA, AGU. (Jack Fishman Mall Stop 401-B. NASA Langley Research Center. Hampton, VA 23695.)

Mey 31-June 4 AGU Spring Meeting, Philadelphia, Pe. | Meetings, AGU, 2000 Florida Ave., N.W., Washington, DC

Juna t3-17 International Symposium on Hydrometeorology, Denvar, Colo. Sponsor, American Water Resources Association. (A. I. Johnson, Woodward-Clyde Coneullenis, 2908 Wesi 7th Ava., Danvar, CO

June 15-18 International Confarence on Reinwater Cistarn Systama, Honolulu, Hawell. Sponsors, University of Hawell's Water Resources Research Cenler, AGU. (Yu-Si Fok, Ganarel Conterence Chairman, Welar Rasources Research Center, Univ. ol Hawali, 2540 Dole Street, Honolulu, HI 96822.)

June 27-30 Western Conference on Water and Energy: Technical and Policy leauss, Fort Collins, Colo. Sponsore, ASCE, League of Women Votare, Council of State Governments. (D. Matchett, Stone and Webalar Engineering Corp., P.O. Sox

5406, Denver, CO 80217.) June 27-July 2 Fifth International Conference on Geochronology, Cosmochronology, and Isolopa Gsology, Nikko Netional Park, Japan. (K. Shibata, Geological Survey of Japan, Higaehl 1-1-3, Yatabe, Ibar-

Extreordinary Ganeral Assembly, Exeler.

19-30 5

United Kingdom, (John C. Rodda, Department of the Environment, Water Dala Unit, Reading Bridge House, Reading RG1 8PS United Kingdom.) Aug. 2-13 Joint Oceanographic Assembly, Hallex, Nova Scotla, Canada. Sponsor, Scientific Committee on Oceanic Rasearch. (Leo O'Quinn, National Steering nmittee for JOA, c/o Canadian Commil-

tee on Oceanography, 240 Sparks St., Ollaws, Onlario Kt A 0E8 Canada.) Aug. 2-8 Second International Bymposium/ Workshop on Solar-Terrestrial Influences on Waather and Climata, Boulder, Colo. Soonsor, Lockheed Palo Alto Research Laboratory. (Billy M. McCormac, Lockhaed Palo Alto Research Laboratory, Dept. 52-13/B202, 3251 Hanover Street, Palo Alto, CA 94304.)

Aug. 15-21 Fourth International Symposlum on Antarctic Earth Sciencee, Ingle Farm, South Australia, Australia, Spon sors, Australian Academy of Science, Aus-Iralian Academy of Technological Sciences, International Union of Geological Sciences, Scientific Committee on Antarctic Research, Geological Sociaty of Austra-lia, inc., Univ. of Adelaide. (J. B. Jago, South Australian Institute of Technology,

P.O. Box 1, Ingle Farm, South Auetralia,

Australia 5098.) Aug. 15-22 Intamational Meeting on Generetion of Mejor Basalt Typas, Reykjavik, Icaland. Sponsore, IAVCEI, IAGC. (Basell Meeting, c/o G. E. Sigvoldeson. Nordic Volcanological Institute, 101 Raykievik. icetend.)

Aug. t5-22 IAVCEI and IAGC Joint Moel-Ing. Reykjevik, Icetand. (G. E. Sigvaldo-son, Nordic Volcanological Inetitute, Univ. of Iceland, Geosciences Building, t0t Roykiavik, iceland.)

Aug. 22-28 11th Injernational Congress on Sedimeniology, Hamilton, Ontario, Canade. Sponsor, IAS. (IAS Congrass 1882, Department of Geology, McMaeter University, Hamilton, Ontario LSS 4M1, Ceneda.) Aug. 22-28 Third Circum-Pacific Energy and Minaral Resources Confarance, Honolulu, Hawali. Sponsor, IUGS. (AAPG Convention Department,

P.O. Box 979, Tulsa, OK 74101.) Aug. 23-27 Second Symposium on Applied Glaciology, Hanovar, N.H. Sponsor, International Gleclotogy Society. (Secretary General, International Glaciological Socioty, Lensileld Road, Combridge CB2 1ER,

United Kingdom.) Aug. 24-27 Ninih Annual Meoting of the Europoan Geophystcal Society, Leeds, United Kingdom. (J. C. Briden, Oppartmont of Earth Sciences, University of Leeds, Leeds LS2 9JT, England.)

Sept. 3-11 Fourth World Congress on Wafor Resources, Buones Aires, Argentinn, Sponsor, International Water Resources Association. (G. E. Stout, Prosidoni of the U.S. Goographical Committee, Wainr Resources Corter, University of Illineis, 2535 Hydrosystoms Laborolory, 208 N. Romine, Urbenn, IL 6180 t.)

Sopt. Third International Kimbarlite Contaronce, Clermont-Ferrend, Frenco. (Francolse Boudler, Università de Nantes, Laboratoire de Toctonophysique. 2 Ruo de la Houssintero, 44072 Nnntos, Franco.) May or Sept. Scioutitic Mooting of IAPSO, Halitox, Canada. (E. C. LnFoud, LaFord Oceanic Consultairis, P.O. Box 7325, San

Diego, CA 92017.) Occ. 6-10 AGU Fall Meeting, San Francisco, Calil (Moolings, AGU, 2000 Florida Avo., N.W., Washington, DC 20009)

Feb 1-t1 15th Pacific Scianca Congress. Dunedin, New Zealand, Sponsor, Universily of Otago. |Secretery-General, P.O. Box

6063, Dunedin, New Zealand.) July 19-23 Fourth International Conference on Pormalrost, Falibanks, Alaska, Sponsors, National Academy of Sciences, State of Alaska, (L. De Goes, Polar Resenich Board, National Academy of Sciances. 21Dt Constitution Ave., N.W., Washington.

DC 20418.) Aug. 15-26 18th Genaral Assembly of IUGG, Hamburg, Federel Republic of Germany. (P. Melchlor, Observatoire Royal de

Belgique, Avenue Ciculaira 3, B-1180 Bruxelles, Belgium.) Aug. 27 Symposium Commamorating the 100th Anniversary of the Mount Krakelau Eruption, Jakerta, Indonesia, Sponsor, Indonesian Instituta of Sciences. (Didin Saatrapradje, Dapuly Chairman for Natural Sciences, L1P1 JL, Teuku Chik Ditiro 43, Jakarta, Indonesia.)

Sepl. 12-14 National Water Well Association 35th Annual Convention and Exposition, St. Louis, Mo. (NWWA, 500 West Wilson Bridge Rd., Worthington, OH 43085.) Dec. 5-9 AQU Fall Meeting, San Francisco, Calil. (Meetinge, AGU, 2000 Florida Ave., N.W., Washington, DC 20009.)

FUTURE AQU MEETINGS

Fsit Meetings December 7-11, 1981, San Francisco December 6-1D, 1982, San Francisco December 6-9, 1983, San Francisco

Spring Meetings May 31-June 4, 1982, Philadelphia

AAPG American Association of Pairoleum AMS American Meteorological Society

ASCE American Society of Chemical Englneera GSA Geological Society of America IAG International Association of Geodesy IAGA International Association of Geomagnelism and Aeronomy

IAHS International Association for Hydrological Sciences IAMAP International Association of Mateorology and Almospheric Physics IAPSO Internetional Association of Physical

Sciences of the Ocean IASPEI International Association of Seismology and Physics of the Earth's Interior IAVCEI International Association of Voicagolony and Chemistry of the Earth's Interior IUGS International Union of Geological Sci-

WRA International Water Resources Associ-MSA Mineralogical Society of America

SEG Society of Exploration Geophysicists BEPM Society of Economic Paleoniologists and Minaralogists
URBI International Union of Radio Science

GAP

Aeronomy

Alid Absorption and scattering of rediction (particles or waves) Stationard and Obstavations on the Americani Stationard and Obstavations on the American Stationard and Stationard Station course recovered to the schemen way, many assembles from the leaf fully bearing. I protected this work of the following of the leaf of the

Electromagnetics

0/20 Electromagnello Theory
symmetrical agrands and histablessings accustoms to
the levels excepte of electromacheric foduction The leakth through of Electro-Makager foluction moder i. Barrer i institute of Goothysics and Planetary Pagics, Sutops Institution of Oceanignatry University of California, Ege Diego, La Julie, California 92041) between 18 proving paper (Parker, 1991) sete out a teory for destilly whether solutions established to the inverse problem is leaktoneague in induction, established mathis for constructing condustivity profiles when their estateout has seen demonstrated. The present paper provides prestated algorithms to perform the message relations at all gardinary concentrating exclusions affected in the page of the provided prestated of elicitates in treated by finding the bestituting solution in a least-squares senses them the steep of the page of the page of the steep of the page of the page 10 pag itting aduation in a least-aquere mense; then the set of the mitti is tested stabilitization to determine the probability inst the value would do not a cerescial to chance, we obtain the options and a cerescial to the spectraline; least-aqueres problem linear in the spectraline; least-aqueres problem linear in the spectraline; least-aqueres problem linear in the spectraline; least-aqueres and luncion is converted into a conjuctivity profile de transforming tes partie fraction approaches to a large profile de transforming tes partie fraction approaches to a large profile de transforming tes partie fraction of optical movings, which always conclust of delia huntione, two other types of each of an examined, the contract of a finite sieue of uniform layers, contracted as that the groduct of tonductivity and finitenest-transforming and the stability are seen in the test of uniform layers, contracted and that the groduct of tonductivity and finitenest-transforming and the secondary are seen to the test of uniform of the collection in the class. Models at the response is arosen as the the layers of the principle of the collection integral equality and the response is arosen as the the finite test of uniform of the Californian integral equality and expenses as a secondary to the second Iteurs, ougrelatetturist.
J. weights, tota, fol, fager (1050)

This statung of the control of the c

"it. Set., tager 181561

٠.

4-

Oldo who troughness measuresting fire incompile wave measuresting by appendical material Pallo a nation of appendical

unifels Date a nation of spin-waldings Date. A. H. futremen [renter for Scientists]
Pepatroent of Physics, the University of Issue at Justin, Auctin, Tt 18712] and R. A. Satenet Verlescribe a technique for releviating wave propagation adapted from the study of black hole privileybelions in convent Sciality, and illustrate its one by treating the cattering of plane electroagnetic fadiation by prefectly worker than onlines approvide. The cathelique e-plays requisions in terms of orthogonal furctions called approved the sechnique are that it ampresses the verterial nature of the problem and allows for single application of boundary conditions. A special lattice to the sphorical case to made in order to compute various aphorical case is made in order to comple on pitals analytical expressions to well-known

Pal. 5-1., Paper 151064

Expioration Geophysics

0920 Majortic and electrisel mulbods THE ALBEORNE SECTEMACHETIC GIBOUVERY OF THE DETOGR SINC-COPPER-SERVER GRPOSIT, HOSTRAFSTER

QUEACE
See 9170 Motth America
L. 6. Seed [Saico Mining Corp. 1td., 55 Unitareity
Ave., Sults 1700, Teronto, Ont., Canada M51 191]
La Juna 1911, e diamond drill operated for Saico
Mining Corp. Intermeted alenc-coppes sulfides in
Frouillas Toursbip in northwestern Quebac. To dete,
two bodies have been outlined. These bodies were
Olacopeaed duting a ground follow-up of a Marh 71
Input Seventrampsatte [281] aurrey.
The Input survey rowered en area selected on the
basis of regional geology and local outerope of
sith volcasic rocks. Conductors were identified
that appeaced to be seemisted with potentially
favyrable geologh. They were selected for Aroued
follow-up, the was the discovery sons.
The eleborne tempcaces over the tone were less
ancouraging then shame often observed over highly
rombactive messims suffides. The low apparent cunductivity-thickness is showly was suggestive of conductive overberden. However, the therester of the
yroffice suggested a badroch nource.

Ground geophysical ronfirmation thentified a
drill tagget.

Subsequent to the discovery, more intensive geophysical surveys, both ground and althorne, wate
carried out. The heat Dr raspease suggested a confined anuros within a such larger steeralised heloMesser ground EH response from the helo rorresised
with the sariy chenal vesponse of the Input
system.

An afthorne EK servey conhocted is 1958 over the

Aystem.
An afrhorna EK sarrey conhucted is 1938 over the same area indectified both conductive mones. However, they were on! tollowed up. Only with ister savances ie explaration with identified and instrumentation were the conductive agness racognized as viebje exploration targets.
GEOFHRECT, vol. 43, eq. 9

Geochemistry

I-In Charletts of the Al-Asphara Pleasance of Minate (MAD) is the especially Manufactured of Minates and Measurement and Clinical

or the second fire plants retrieve force, of control to the second force, off control to the second force the second force to the Agency, Baseline Relative for the Agency, Baseline Relative for the State Fitters.

to the Agent v. Madesen i Triangle (arth. North it cline 1711).

Burd on the restated althospheric distributions at whose and propose (at middistrator is the rethern hemisphere) and a misplified as hanted for tietr o-lidicon, it is predicted that accelerable as whose, and PAR [FR/G100006] are which it is a verponents of the tropasphere and the liter strainosphere. Average acceledingle come on titles them secans orderion id 22 parts per titlion (ppt), 3 ppt, and 1 ppt steerage accelene conscitutions of 17 to 34 ppt, 97 to 360 ppt, and 40 to 85 ppt are self-early 97 to 160 ppt, and 40 to 85 ppt are self-early 97 to 160 ppt, and 10 to 85 ppt are self-early 17 to 160 ppt, and 10 ppt are restriction of 17 to 14 ppt, 17 to 160 ppt, and 10 to 85 ppt are self-early 18 bit, respectively. These calculations adapted that in the troposphere calculations adapted the proposphere and the self-early by a such or note abundant as their form may by an each or more about

Izvestiya Atmospheric and Oceanic Physics Volume 16. Number 6

Natanson G. A., Toloknova T. A. Application of the Kazaosky — Monio Theory to Models of Atmospheric Boundary Layer Yascheoko B. N. Experimental tavestigation of the Temperature Field Spatial Structure at Turbulent Convection Plans N. Z., Litvinova V. D. Somo Results of the Experimental investigations of Microscolo Tarbulenco in Layered Cloude Yasovitsky E. G. The Radiation Field to Optically Thick Atmosphere with Nearly Convervative Scottering Conservative Scottering . Chaptyoin V. I. On the Temperature Distarbances of a Fluid in the Noostellonory Chaptyoia V. I. On the Temperature Distarbances of a Fluid in the Noostellonory Velocity Field

Mikhailova E. N., Shapiro N. B. A Two-Dimensional Model of Evolution of Synoptic Disturbances in the Ocean

Koslov V. F., Sokolovsky M. A. The Influence of the Cylindrical Topographical Disturbances on Unsteady Zonal Flow of Stretified Fluid in the Bote-Plane Zhurban V. M. On Viscous Stoge of Turbulent Patch Spreading in Stably Stratified Fluid

1. 846

Sirakov E. On the Dynamics of Wat Non-Adiobatic Thermolo shove the Condonestion Level . Gurvich A. S., Yarchenko B. N. Frequency Spectra of Temporature Flactasticas at Tarbaicht Coavection

Boronoev V. V., Gomboev N. Ta., Zabritohy E. V. Optical Measurements of Intensity Plucuatian Profiles of Refractive ladex of the Atmosphere in Mean-

Matcshvill Ya. D., Rosenberg G. V., Sandomirsky A. B., Sushkevich T. A. lave-stigation of Strotospheric Aerosol Stratification in the Soyuz - Apolloa

Police Coefficient in Cloude by Measuring Reflected Laser Pulco Ivanov A. L. Karimova L. M., Korovchenko V. N. Spectral Invostigations of the

Nataral Aerosol Absorption

Konopasov N. G., Kunin Y. N., Pleanivisey V. S. On the Possibility of Affecting
the Local Electric Field of the Earth by mesas of a Powerful Vertical Thermal Current
Mirchina N. R. Pellnovsky E. N. On the Asymptotics of Wave Matienn on Field Sorface

Caffice ARB BIBLIOUS ARB BIBLIOUS ARB BIBLIOUS ARB BIBLIOUS ARBOR. A Callbration apperiment for the Second Upper Ocean (Cambridge University Press, 1977, 336 pp.)

Voli S. S., Gerodisov V. A. Book Review: Le Blond P. H., Mysak L. A. Waves in the Ocean (Elsevier Scientiffs Publishing Company, Amsterdam Ox. 1978 by a group of Federal Government for the Second Scientiffs Publishing Company, Amsterdam Ox. 1978 by a group of Federal Government for the Second Scientiffs Publishing Company, Amsterdam Ox. 1978 by a group of Federal Government for the Second Scientiffs and research project for Market Scientiffs and Sc

oltrogen is in chedical equilibrium [CB_C100010] = CM_C10100 + KO]] with inorganic NO; and acts as reservoir of inorganic NO; [Reservoir of Inorganic NO; [Reservoir traibed for PAN are currently aveilable to vertif these predicted results.

Geophys. Son. Latt. Paper 11,00%

Itéo Georbronelogy ings determinations by radioactive processes)
A SEW INTERPRITIE PROCESSES file WHOLE ROCK U-Ph
SYSTEMS, APPLIEO TO THE YESDEPONT CRUSTAL FROFILE
S. Walks I Baroard Trice institute of Geophysical
Zenearch, University of the Wignetarared, Johumashurg, South Afelica, 2000) 1.0. Efcolaysen
Geanuite grade bracambelse gasiness have ususelly undergoes at least one paried of tirong U
depletion. Whole rock O-Ph featope studies rea
dataroine the timelet of the savere depletion and
this work attempts to place such studies on a
more rigorous feating. 2-atage U-Pb artense can
be described in terms of one major, epfectic diffarantietion into roche with varying S/Pb setion,
while J-range systems can be described for two
such disrinct spisodes. Host of the PraCambrian
granuitate which have been isotopically smallysed
have historied too complex to be described as 2mile systems. Rowavor, it is demonstrated have
that U-Pb dets or whale roch sulins cen field the
complete U-Pb chealous blacory of a leshega system in term of S/Pb reafosi. For a suite of
granuites, pressed day 20°Eb/20°Pb and 100°Pb
ratios and element concentration acts ellow these ratios to be calculared at a number of
apacific pest times sob platted as en arrey. The
dehree of scatier in sech of these 'past arreys'
in graphed as a lunction of time. The point al
least scatter denotes the ege of the end of stags
2 in the history of the system. The sere slope
and the dating of stage 2 to be calculated. All
other persentars in the system. The sere slope
and the dating of stage 2 to be calculated. All
other persentars in the system is and Ph concenreations by history at the calculated.

2 in the history of the system. The sere slope
and the dating of stage 2 to be calculated. All
other persentars in the system is and Ph concenreations of the stage 2 to be calculated.

2 in the history of the system is and Ph concenreations of the stage 2 to be calculated.

3 in the process of the superious highs of retiogulables sentitively among crystalline hadement. Some fundamental features of Archaean hatement avolution, whose diraliad significance is still poorly understood, wate e-judidated for the lirat sime by this U-Ph isotope study on whole-reach samples. Racks which suffered little utenium deplation at the pad of stells is suffered lesses at the and of stells is suffered lesses at the and of stells is suffered lesses at the soul of stells. Bocks which were most affected at the end of stage I ruffered the strongest heplation at the end of stage 2. Svidantly, repeated high-grads melemorphism purges certain greaulites of their I rollent but leaves others relatingly nescented. (U-fb systematics, TroCambrian granulities, Inter-pretive procedure, 1-stage history). J. Reophys. Res., Red., Paper 121057

1:00 Geochronalogy lago determinations by railo-

active processes).
CONCHRONOLOGY OF THE DEEP PROFILE THROUGH

ANCHEN HASTMENT AT TREDEFORE, WITH INFINITION FOR KAMEY CHUSHAL EVULUTION, P.J. Hari Ibernard Brica Rosearch, Michael Chungashury, brief indicates at Geophysical Rosenich, University of the Wicearararond, Johannasburg South Airico, 2001) H.J. Welbu, L.O. Nicolsy Ind presence of Archase granits forming the cote of an updaced and overturned sequence of strata st. Vrsdeiotr. South Airica, has been The presence of Archaes grants forming the core of an updoord and overturned sequences of strate as 1 Vradefort, South Afters, has been haven (a) over teventy wears. Recent geophysical, geocheoical and geologics is vident on hes given rise to the proposal that the basement gradile core has also been overturned, presenting a section of the core's grantite crust to view and that radial traverses in the fradefort beauther, sentence in the door, the upper levels of the fradefort beauther, sentence of the Archaen rrust, when moving from the contact of totilar attest to the centre of the door, the upper levels of the Vradefort crust as dominated by a relatively homogenous Outer Crunits Cheles (UGC) displaying marked gradient; in tit alements. These tooks grade inwests into the deeper levels of the fradefort areast cores grade inwests into the deeper levels tooks grade inwests into the deeper levels the door of the fradefort areast predoctionant; of letse intended to unconfist predoctionant; of letse intended to unconfist predoctionant; of letse intended to unconfist predoctions of mails meta-volcadle and estimations of mails meta-volcadle and estimations of mails meta-volcadle and estimations of mails meta-volcadle and estimation of the fradefort areast the formation of the fradefort areast formation of the fradefort areast intended in some reported. The results permit aslque and direct tests on the theories of Archaen crust forming procestes. In the upper Vradefort crust while rost intherion ages of ~1050 My are whelead iron the four decay schema, and always all evidences of an extended crustifications for the fradefort beautiful presentation of the fradefort bea the St-2r Isotopic system in the first roche and rircon ti-fa eyes; an episode of strong urealum depiselon alfected both the first and medic roche of this sector ~ 2800 My ago. The minimizes beautyperformed in evidently e nork unit with a long and complex histore, beginning with the amplacement as a crustal unit at least 1800 My ago. Since then it has been subject to revorting and resetting of isotopic systems which toreleased ~ 2800 My ago. In the desper frust there is east syldence of a 1930 My ago. In the desper frust there is east syldence of a 1930 My ago. In the desper frust there is east syldence of a 1930 My ago. In the desper frust there is east syldence of a 1930 My ago. In the desper frust there is east syldence of a 1930 My ago. In the desper frust there is east syldence of a 1930 My of disprint fo the upper 71selfort arust. Thus, the less major events that effected the gootherical constitution of its Wredefort eyes and desper crustal sectors dilliered in time and nature neverthing the syldence of the medical cooler, rigid end unaffected. These massing cooler, rigid end unaffected. These massing cooler, rigid end unaffected. These continuities in the cooling of the Archeso cratilities and the cooling of the Archeso cratilities and sylden in the sylden expenses the continuities in the cooling of the Archeso cratility redefined profile, instops systematics, created avolution).

Geodesy and Gravity

Crophys. Res., Sed, fapor 801770

1905 Actificial shighlite terrangees
1104 AND GEOGRIC OBSERVALIONS FOR THE
SEASAL ALTIMETER CALIBRATION EXPERIMENT
John M. Dissapate, Bruce C. Dunglas, David L.
Porfar, Robert P. Nasfermon, Jr.
[Marineal Oceanic And Almospheric Adminiatration, Matlenal Ocean Survey, Rockellis,
Maryland 20852)
A cell brat tion experiment for the Seasat
radys, attimeter was conducted in the Maryland
1978 by a group of Ferral Government
aspecies, universitian; and research promotiaspecies, universitian; and research promotiastines. As part of the Seasat cell bration
activities, at tide 1989 was instabilied by the

Separates

To Order: The order number can be found at the end of each abstract; use at digits whan ordering.

Cost: \$3.50 for the first article and \$1.00 for each additional article in the sama order. Paymant must accompany

Deposit Account: A minimum of \$10.00 may be placed on deposit with AGU for the purchase of separates, & funds are on deposit, the cost of the first article is only \$2.00 and \$1.00 for each additional article in the same order.

Saparatas will be mailed within 3 waake of journal publication or within to days if ordered after the journal has appeared. Separatas ara avallebla in purchase for two years from date of

Coplas of English transletions of articles from Russian translation journels are available aither in unedied form at the time of their listing in EOS or in finel printed form when a journal is published. The charge is \$2.00 per Russian page.

Sand your order to: Amarican Gaophyaical Union 2000 Florida Avenua, N.W. Washington, D.C. 20009

Hafford Ocean Survey at as open contri-lacetian so Bermude to provide a determina-tion of the intenteneous tra-turfers height during the Seatst overflight of the island. The lide aggs wat geddelically tied to like later tracking station on Bormude, so that Seatsf's potition relative to the surface could be deformined independently and compar-ad with the value provided by the sitinglar memberoeneous. The root two tquara (855) error in the dolorminetion of the vartical position of the later, robelive to the sea turlect, hat been estimated to be 4.0 cm, exclutive all postible errors duo to lack of procite lafarmation on the elevations of the goold at Sarmude, J. Goophys. Ras., Rad, Sepse 125008

1956 Relation of gravity Cheerystions be

CRAVITY MODEL, AND STRUCTURAL IMPLICATIONS OF THE CODOMO PENDANT, Signa MEVADA, CALIDANIA Admard A, du Bray (O.S. Occloquical Survey, Saudi Archian Hissian, APD New fort 006971 N. W. Oliver (U.S. Decloqueal Survey, Mealo Part,

California 94025f
A mobserface model for the Goddard pane A scheurface model for the Godderd pendant is constructed from a regidual gravity tigh of about T easi over the speciant. The model, which is the simplest and most goologically respectable possibility, shows a metanorphic block that tepers with depth and extends about 3.5 be below the awtice. The structures le the Codderd pendant are mindler in types and orientation to indeed the single pendants, indicating that the aboutty took was seither defreed out total dering pluces maplecoment. Consequently mepiscoment much have been a passive rather than a forceful process. The peadost itself. represents a pleas of country rock trapped between plutons which are done shaped in cross

sertion. J. Geophys, Res., Snd, Esper 130963

Geomagnetism and Paleomagnetism

2580 If me vertations, paleomagneties SALEGHARRETIC CLARILATION of ALEX-IA MIVER ALECHAR AND ATTORS A. Sogus Hearth Scienas Source, University of Californie, Sente Grus, CA 930641 and R. Coe A statistical method is developed to evaluate straigcaphic correlations that are been on the selective of paleomagnetic directions. It involves comparison of the probabilities that such directions could have acissn by ill simultaneous or 121 random semplings of the enciant magnetis Isld. To assume the affects of paleomagnetic errors and paleomagnetic thase probabilities one must stimate the affects of paleomagnetic serors and paleomagnetic strors and paleomagnetic serors and paleomagnetic strors and paleomagnetic strors and paleomagnetic strors and settlem at the alection of the story of the send of the strong and server and paleomagnetic serors and contained the flows thought to be the assess an embediate of those thought to be the assess and contain the flows thought to be the assess and contained appropriate of the general affects of paleomagnetic diseasions it a much were likely explanation of the general affects of paleomagnetic diseasion than share agreement of another field diseastforms. The alepiast inferpretation of this casult is that many of the flows at the two attess are the asses, implying that series of Grands Ronde Siova extended over distances or systemism hunded tilluments. If also capacities, councils and actual councils. yaeistico). J. Geophys. Res., Red. Paper 180918

2660 Time variations, palaemagnatiin ZONAL HARMONIC HOOELS OF REVERSAL TRANSITION FIELDS

1. Williams and M. Fullar (Dapertment of Geological Sciences, University of California, Sente Edrbara, CA 93106)

Synthetic reversal records for different latitudes have been generated for model transition fields with raribus -energy from an exponential deciy of the - within dipole field to 92, 93 and 94. The rscords sephenias the dependence of their characteristics upon the latifude of the characteristics and latifude the specta of the records. petween these boy the time to complete and estimates of the time to complete them are an estimated and the state of the st and astimutes of the time to complete the wife latitude. A particular model in which the things in angula radiatributed to get ... of and of according to the ratio 21518 15 jusque fintes the last enversa (Raversal, Hoda), Obsarvation alia (Raversal), Hoda), Hoda),

Soviet Hydrology Volume 18, Number 1

YASLENKO, N.O. AND E.S. KHERSONSKIY, Flood Runoff Coefficients of the Rivers of the Cantral YARLENNO, N.O. AND E.S. KHERESPARKET, FROM Regain Controllers of the Rivers of the Cantrol Section of the Baykal-Amur Mainline
ZHEKOVA, M.A., Formation of the Jame and Their Clairibution
ZHEKOVA, M.A., FORMANDZHOGLO, O.V. VOROPAYEV, AND O.O. OHIN, Problems in the Scientific Justification of Large-Scale Water-Management Practimes for the Tetritotal Redistribu-

AUTSE, O.A., A.A. BUSTARDENDED, V. VORNOFIEV, AND O.S. Offin, Problems in the Scientific Justification of Large-Scale Water-Management Practimes for the Territorial Redistibution of Water Researces. 14

VOROGRETSKIY, V.YE. AND O.V. GO LOFAST, Estimation of the Effect of Agricultural and Rivicultural Reclamation Practices on the Minimum Runnoff of Lowland Rivers 20

EMPETSKAYA, A.B., Change of Sediment Olacherge and of Suspended Particle Concentration is the Kuhan' River under the Effect of Industrial Activity

EMPETSKAYA, A.B., Change of Sediment Olacherge and of Suspended Particle Concentration is the Kuhan' River under the Effect of Industrial Activity

EMPETSKAYA, A.B., Long-Range Forecast of the Flood Volume of the Oka River with Allowance 25

EMMMANDY, V.V., Long-Range Forecast of the Flood Volume of the Oka River with Allowance 34

LEVIN, A.G., Flesh Flood Forecasts with Hydrograph Separation by Individual Time Intervals 40

EMPLOYMENT, V.M., Drying Out of the Aral Sea and its Consequences 46

SENDLOY, B.L., Formation of River Ioling 33

KICHMENT, L.B. AND N.A. TRUBIKHIN, Numerical Construction of a Two-Dimensical Model of A Kinematic Wave for a Oratinge Reale of Camplex Topography 58

PODOGRETSKIY, V.Y.E. AND R.S. ZAYTSEVA, Results of Additional Investigations of the Effect of the Facest no Maximum Spring Flood Discharges 70

ABSTRACTS 77

Hydrology

HIS desposation
HE SEE OF THE SQUILLERIUM TEMPERATURE TO
ENDINE THE HEAT BALBACE OF A VATER SURFACE

[HEALTER THE THE PROPERTY ASSOCIATION OF MELAGORIDATE PARTIES, Complete Scientifique des Câneaux, l'arrens dos landais, pp 45, 5170 Aubilies, terest, J. P. Albignat and M. Tanba iron a series of 63 duily heat balances for Item a series of \$3 dmlly heat balances for set take in Godivable IFrancel, dmlly set mather at the set of beating \$5 for variation in the rate content) of the taken are smelyaed by the autors of Edinger at al. (1988), Katjman (1874) for equalibrium temperature. This enables the calculation procedure and the formulation of the schapes constituient \$K\$, and the equalibrium temperature \$T\$, but he Otteringuished which glass we nest settlets of the rate of hearing. In stitute, the date are need to describe the daily addressed between the second temperature of \$K\$ and \$T\$ for the same and suturn wreathing allows the life, these balance, water surface! |Me. (Meal belance, water surface| th lastes| S.teness Sult. vol. 28, no.2.

O COMMENTO COMMENTATIONS OF LEAST, LAYER D. OFFICE, ISCORPERED, MOMEROTRAPIC ACTITIONS (J. tale, J.A. Magott, and P.J.-Y. Ma Mornett

Pe Roandary Integral Piguarion Huthor has pit-To Regadiny integral Popusion bothed has 1958 study been used for linear, becameneous problema, brus apper it has been applied to complex applied to some less applied to some less applied to a since the equal lens are nonlinear. And equations are used to that leady, largered subters. Matrix metatructuries estimates of figures, and problem the question is instead computers from them problems. Houseless, internal expensions the leady wind form, layer of equations. ente Seams. Ben., Eapar 180905

The Weamar. Res., Inpar 190905

The Groundwatest a STRONTHEO RECHARGE

A STRON COS ESTRONTHEO RECHARGE

A STRONARY TION FROM GROUNDWAYER

ET. Solth and S. S. Wiktranarasa (institute if the cost of the second strong and boundary flux it the first of the cost of the second strong and boundary flux it is experiently for the first of the first of the second (inferred recharge is propeas)

A this estimation of manusca directly in the first of the set leating, headed upon water level evidently observed upon water level for control evidently observed upon water that the forest the control of the sample of the interred recharge wethout the level observed upon water level evidently of the sample of the interred recharge water level to the sample of the simulations have been end to see the reclaim if the observed instituted in the sample of the standard on examine the sample of the simulations have been end to see the reclaim if the observed standard recharge results. [Kuobarge, situation, boundary fluxes?]

A stolegical Eclencies Butt. vol. 26, eq. 2.

RN Groundester
LETRICAL RESISTIVITY-HORRALIC CONCUCTIVITY
CASTOCACOPS IS ELECTRA COUNTRIES ASSUTERS
So, Dutin Department of Civil and Environmental Engineering, University of Rhode Island,
Fouriest Islan relationships between experent
forestion factor from surface resistivity soundtops and independent conductivity from pumpfing
little In Tream water granulate against unually
see positive correlations, these relationships and independent of the Island by theory if consideration takes of in-altur field conditions.

A sound theoretical basis for relating appears to becometical basis for relating
appears the states of in-altur field conditions.

A sound theoretical basis for relating
appears the states of presentation functor to partinent hydrogencitive lateration functor to partinent hydrogencitive lateration functor for partinent hydrogentrop is a three-presse parallel resister model
alcohological includes parameters of porecitive resistivity, grain size and shape,
forsity, introductify, and intergranular surface
forsity, introductify, and intergranular surface
forsity, introductify, and intergranular surface
forsity, introduction is an important factor
to make the surface of the theoretical
resistivity and sizes end high poremater reallistivity and interpretation of the short that
factor. The model further shows that
findingly dependent on porosity.

The surface conductivity here
is factor in hydraulic conductivity, heing
imports the surface of in-alture precision
as presented variable of in-alture precision
as presented variable of in-alture precision
and internal states and precision and
interpretation between existing apparent formainterpretation between existing ap

titer Resour, Zes., Payon William

His Groundwater

GOMENGTE DISCREMENT TO THE PACEFIC OCEAN

La. Sabter Water Problems tractives,
GOMENGTE DISCREMENT TO THE PACEFIC OCEAN

La. Sabter Water Problems tractives,
GOTA Academy of actences, 11/3 acdorsays
GOTA Academy of actences, 11/3 acdorsays
Led R. G. Dehanlow

History grather St. LeJOSA Hoston, USSEL

Led R. G. Dehanlow

History set faportant to hydrology had geology,
to the conflict poster to hydrology had geology,
to the conflict poster se presented. Is subhadd

Ler evaluating them as my presented. Is subhadd

Ler evaluating them as my presented for the

Filled Academy of the conflict set of the

Ling discharge without and the Tractors govern
Vites outflow to the present of the recommendation

Assistant activities the presented of the ground
Mallow Latitudiant Physiographic possibility.

Fidulogical Solencia Hell, vol. 26, pp. 1, 11

THE MAGNITURE OF THE HYDDUGICAL
PREQUESTY PATTOR IS MARINEM
RAINFALL ESTUNATION
D. M. Hershilaid Hydrotogy Laborevory,
HUDA-SEA-R. Bel Leville, Heryland 207051
Chow's hydrological frequency feator, P. Is
used to compare and relate results and attach
probabilities to several sets of maximum
eainfall date. A is primarily a function of
the recurrence intervel for a particular
probability Oleribution. A is Oleplayed as e
function of the mean of the annual maxima tor
both officetal and unofficial rainfall observations and ine probable maximum pracipitation
(BMP) and MMP/2 for the S and 24 h durations.
The magnitude of the unofficial subservations
appears to heme a strong influence so the
level of BMP. The geographical distribution
of X for the latter is displayed on maps for
the eastern UB and ranges from about 20 in the
mouth to more them 15 in the north for FMP and
from about 7,5 to sore team 17.h for FMP/2,
Probability seams to have very little seaming
for PMP or for tee largest unofficial observations become them to manifect and observations become them to make the product of the cord
upon which they are beand. Praquency iscore,
mexture rainfalls!

The Brund and externion because

CAM WE NOTE THE REINFALL (PROFT PROCESS
TORAY?

F. Name I Laboratory of Bydraulics, hydrology and Glactology (PAM), this Camerum, Ch-8092

Earlich, Switzerland:

In the last two decades, Comy rainfall-runoti endels nave been doveloped, teston and the remules published. Note of them give, as their authors claim, settletery results. But, diven that the testies are good, why do now pobles continue to be published? And why is the unit hydrolysph actif the best widely used spreach, although at is making the both application; in the study procedules been ended of different complexity have more calibrated to there entil pasing (1.7, 10.2, 10.2) and with degree networks of securding talm-junges (2.6, 1.0, 40.4), qualminational reliable stream junges. The tenuits show that simple models cannot were fees into failure in contain casses, because notes of them adequately inacting the reliable to the procedule casses for the dequately inacting the study of the decades of the dequately inacting the could not be proved that or pick and the pick and the

M(6) Runoff end eltremflow THE EFFECTS OF MAN ON BASIM RUNOFF, AND ON THE WATER BALANCE AND MATES STAGE OF THE CASPLAN SEA 1. 2. Shiktomanov [Sta-s Sydrological (Institute, 2 Lint ja 11, 19905] Leningrad,

Institute, ? Linija 11, 199051 Lealograd, USSA1.

This paper onnel dars the effects of man on the runoff of rivers Figuring into the Capian Res. beased on loop term observational date from the hydrometeorological material and on the satiyate of experimental meter belance Onta, member of investigations of actual and future runoff varieflone te individual rivers [Yolpe, Oral, Torse, Kusa stc.] and of the total leftow lots the Capian Wes due to different types of economic activity are analyzed; and the role on man's influence on anneat stages is estimated. [Water balence, Capian Res]

Hydrological actances Seil. vol. 36, po. 1.

3160 Runoff and streamflow OVERLAND FLOW ON A DIVERGING STREACE TO A DIVERGING STREACE W. Agiralogiu and r. P. Singh | Department of Civil Engineering, Mississippi State University, PO Box Drawer CE, Mississippi State, MS 397821 Many basins le meture diverge or posenax Olverplug slamabots. Vite study forunistes a diversipp flow model utilizing kinematic mease theory. The htematic squattons are solved theory. The breastin squattons are solved maing a first order explicit finite difference achema, the model to tested oning data on a number of leboratory basine reported to the literature. A compariton of this model with the plans model shows thus they flaid different concentration times and hydrographs the Olffer to happ, dapending upon the dagree of dimengence. [Overland flow, diverging purface]

3160 Rusoff and strashlow
ADAPTIVE SYMMODICAL FORECASTING
- a REVIEW
P. E. & Connell and S. T. Clarks ifastlists
of Sydrology, Wallingford, Gone ONIO Gas, URI
With the increasing use of tetemetry is the
control of meter resource syntams, a considersite amount of a Sfort in help devoted to the
development of models and persenter estimation
techniques for on-line use. A veriety of models
and persenter metiantion significant have been
antidered, ranglog free compliar conspiration
considered, ranglog free compliar conspiration
which are traditionally edithered off-lines,
which are traditionally edithered off-lines,
syntams, have anjoyed undue popularity to the
recent literature due to their cathestatel
elegance. The fundamental commattees anderiying the various approaches are revised, end
the validity of these assiptions is the
hydrological forecasting context is amenand,
bydrology to saking casessemb of the reliables
works of different social and persenter
setimation significant makes the revised of
different inharcomparison of a number of
castlogi
mydrological Sciencies \$6(1), vol. 26, 10.2. mestice! Sciences se(), vol. 26, no.2.

1660 RESOFT and htreamlies
LANG THE PROPOSES OF STREAMSTER
POLICEMENT CLEAR COTTON AND EMERICATE
L. B. SHIFL JR. INDEM Persat Services
Southeastern Porest Expeniesht Réalina
Contéte Sydrologid Laboratory Otto,
Korto Candijan 207637 and M. T. Seash
Long term chandes in a tremsflow following
Long term chandes in a tremsflow following
forest cysticle Are presented for three amperiforest cysticle are presented for three amperimantal brains at Contests mydrologic importance,
Morto Catolija; (Sh. Praytous analysms have

shown that, following lorest cutting, stroam-llow increases and then declines with the logarith of time as the forest regrows. Secent date indicate that the strossilow decline following cutting is related to veja-tation regrowth, but he relationship to not a consistent function of simple stand peacure-ments. The mised hardwood forest of one hasin was clasecut twice in the paper 40 years. During the second regrowth period atrustics increases after in a litest year were about one-half the increases at the same points in rips after the litest treatment. Concurrent with the socood cuiting, two other basins were cut whose mid-sevations are 400 m higher. The increases lor the upper basins were loss than lor soth streamfees increases were loss than lor either cutting on the lower basin. Variability of low increases for the three cuncurrent treatments to similar and appears partly related to precipitation. Ideaccutting, regrowth, atreasflow response!

3150 Sumple and attractions
A OLETRIBOTION FUNCTION APPROACE TO RAIRFALLBURGET MORELLING

2. J. Bore | Lastitute of Rydrology, Validaged,
Orne Util SER, Registal, and S. F. Clarke
This apper begins with a pricique of existing
rainisi-runotf models and proceeds to a largely
sew lerwolation in which the simple ators
languagesting, for example, intercupilon of
rainisi-runotf models and proceeds to a largely
sew lerwolation in which the simple ators
languagesting, for example, intercupilon of
rainisi-runotf models and proceeds to a largely
sew lerwolation in which a sumple and
languagest of such an assumption are
il upper soil layers; or gonelidy bold) is
replaced by a statistical population of stores.
The gausequeers of such an assumption are
il lestrated for the elapiest, one-pyrameter came
in educated clairibulion of siors depths is
apposential. It is demonstrated that the use of
a population of stores, even with dut one
parameter, cool is afford a plausida description
of the relation between schuel evaporation and
soil moisture delioit; (d) remove Discontinutties
of hradient in the objective tunction,
uptimization of which hives satingies of model
parameter. The new lorentiation also permits
odeservet runoff to be written down as a
raisively simple lumied not past ratiniii,
potential evaporation, and the persuaters in the
statistical distribution of materiaes, wild tile
consequence that gradient methods can be used to
optimize ide odjective tunction to place of more
time-consuming direal search selhods.

The saturation of tunoff in the basis outfall id
sectopicion at the previous flow and an additive
tunction of rainfall is obtained where the
security equal our rainiting current flow to a
proportion at the previous flow and an additive
tunction of rainfall is obtained where the
sectopicion at the previous flow and an additive
tunction of rainfall is obtained where the
sectopicion at the previous flow and an additive
tunction of rainfall is obtained where the
sectopicion of the previous flow and an additive
tu tunstions, the Selbuil and mans, are udtained Serias and parellel configurations of Bigtribution function models are considered, and the relating of the models' steemtal structure to Bifterent types of slove commonly employed in

toscaptual modelling is discussed TSs has formulation includes, as particular cames, all models based on liber statems theory Agrication includes, as parificular cames, all models based on linear agreems theory arginess of fire, raintail and evapotrana pirction from camber of its institute of Rydrolargy's ampayments basher facults in very good model predictions at lives over the calibration period, with 8' values above 0.8 Posses, ibla level of performance it measured by the 8' sistlatic is not saturated the state period, although quile reasonable predictions of the fined peace are still obtained. The drop is performance is hartly mettibed to the sature of the calibration geriod hurle, which his hainable view 'estiling aprilar fine press of relatively stress Brought. Model perioreace mer the test previous is hartly make a sore realittic taltai readition for the state assumption of the test period is topywhed by making a sore realittic taltai readition for the state assumption, but only at the perponding approach in reade of restore in one call the loss period. The ment is performant in the period of the period of the period of the same of the state assumption of the period of the last assumption of the second of the period of the last assumption of the last assumption of the period of the last assumption of the greatest.

Hith thow and ice
AREAL DISTRIBUTION OF SHOW MATER EQUIVALEIV BY
ENVI COVER RCHITCHILD
J. Harrings and A. Roppo (Code 924, Soddard
Space Flight Cooler, Creanbell, Estyland 20fil,
U.S.4.)
A method is proposed to determine the ereal
Oistribution of the casimum seasons water
equivalent of snow in mounials basims. Because
a sulficient density of Oirect measurements is
not available in remote, Inaccessible steme,
the securial into a soow at the start of the
metting season is reconstituted. The disappearance of anow in grid units is multicred using
leadant data, the number of dagree days
necessary to melt the snow to totalized, and
the water equivalent of the anow melted in
calrolated. The reconstituted water aquivalent
volume can be used to accreat pracipitation
seasurements to winter. Together with lighted
polit measurements, those new areal date can
improve the evaluation of more removes for
messons Oischerge foresants. 156cm water
equivalent, remote sensing, degree days,
discharge foresmels).
Vater Easout, See, fapor 14103h

JITH Soil colsters THE NATER BALANCE OF THE BETTIN MASSE, 120TA
J. 4. Sutcliffs limitation of Sydrology,
Malingloro, Osso Exis Sab, UKI, E. P. Agressi
and J. E. Tucker
A study of the wates belance of a basin Sn
India, where the squal monacon session of water

thits, where the should monacon season of water sorp as contrest with a longer period of deficit, shown that estimates of oul soul sours recharge and Croundester techarge may be obtained in these circumstances by romparing seasonal mat reinfall with runoff on two from year to year, and Groundester metherge to constant from year to year, and Groundester metherge to proportional to tunoff. [Majer balance, Magmel Bydrological Eclerces Swil. vol. 28, no. 2. 313 Soil soilture Weating and Nickshaye Soil Moleture Weating and Nickshaye Rimelation T. J. Jeckson INSDA-SEA-AR, Sydrology Laboratory, Flant Myriology leatitude, Marte Eastern Region, Beltsville, Maryland

Laboratory, Plant Newschology leatitude. Maryland 20705, USA1
7. J. Schwogue, A. O. Sicks, G. S. Column 20705, USA1
7. J. Schwogue, A. O. Sicks, G. S. Column 2015, USA1
7. J. Schwogue, A. O. Sicks, G. S. Column 2016, P. S.

data remote nensing onuid provide. These data ware used to evaluate the utility of periodic soil owisture measurements for system updating. Anatyses indicated the potential selue of the data and supported the evaluation of a larger case. [Persons sensing, microwave, soil moistured Hydrological delenies Suil. vol. 26, no. 1.

hido Water quality
THE USB OF BRECIFIC CONTACTABLE
LB STUDIES OF HATURAL MATERS

THE USE OF DESCRIPE CASHLETANE.

IS STUDIED OF METURAL MATERS

AND SOLE SOLUTIONS

1. B. L. Foster [Department on Geography,
Covenity Itenchester! Polytochnic, Priory
Sirest, Coventry CVI 578. LBI, i.C. Grheve
and A. D. Chietmas

Bpoolfis conductance (SC) is within and e
veriety on models have been suployed which
relate SC to tated Otentives onlike 1703) and
Led videal lands concentrations. This pepar
attempts to emituate messel models and highlights two major problems associated with thes
free smalyels on veter samples collected hrom
two small ratchments in East Dovon and Norta
Marvichabtrs. Fleetly, the presence of
desolved organis material, at the levele
encountried in well solutions, may mestously
affect the SC/TDS relationship and M122 often bo
es undetected component on dissolved load.
Secondly, the less ps on scale water mamples is
shown to affect those models which calculate SC
on the healts of individual lonic concentrations.
This results have thigh B* too levels and
associated increased solubility on other lons,
each as Fol³, All and M2² which are not
consaily determined in vetter quality studies.
Upschils conductance, soil water)
EyGeological Sciences Bull, vol. 26, no. 1.

Meteorology

paying the deep curvalualistus in each cluster was a lagaritate in active travective travelar to a large travective travective travelar to a large travective day convertive rails. The extension of extensions of internalized low-level concernment with the stration of extensions of internalization adjacent to travective day convertive rails. The extensions of extensions of the extension of extensions of the extension of extensions of the extension of extensions and the extension of extensions and the extension of extensions and extension of extensions and extension of extensions and extensions are travective to extension of annulumbours with stokic at the closest active extensions and ext

forcations and mesoscale tonvergence patterns. Experimentation with ways of including same of these leatures of thepical convention in large-scale diagnostic and proportic studies is unierway, but much work remains he be done.

Ser. Goophys. dgate Phys., Paper 181003

3723 Convection, turbulence, and diffusion bases RADAR TO ESIPHATE 013819AFOR EATES 18 THE LATES OF TERFLERKE J. Welcotock | Nature of Ocasir and Almospheric Administration, Larcomow Labotetory, Esulder, Africal tration, Agronomy Laboratory, Colorado 801011

Administration, Agranous beddecory, assurer, Colorado 801011
A mathod is desarthed for eastingting the energy diestpation rate, c, from raday measurements of the structure parameter, C₁₁. Le stably stratified layers of turbulence. This mathate applies to bortcoatal layers of turbulence whose thistness, i. , is leasn theo the verticed, resolution, 2h, of the radac it. c 2h). Both a within the turbulence layer and C, the everage of a cost the sadar volume, are Outer-educed. The derived expression for a to based on a theocetical relation of turbulence layer thicknesses to the becomes to each.

LOGISTAE CTORD-TO-CONCOLD FIGHTHING ATTENDED IN

315 Electrical phenomena Positive Cloud-To-Grand District From Processes and Processes From Laboratory, 2004, 1113 Habley Circle, Norman, Obishoma T30651 p. NacCorana and M. Arachd The occurrance of alcoud-lo-granded Standes Lbet affectswelf lower peases for change to sarih (900 (lash) ever Test terrais has been documented in the cetture shage of severa themderssorms. Of the 31 Sepancested 900 fiscales, work had only one reterm stroke. Lero-so-peak the last lass for the stokes sveraged Yuk. The 900 fiscales sveraged to accument grand \$20 on I severa stroke sveraged Type Table 900 fiscales sveraged for the stokes sveraged Type. The 900 fiscales sveraged for the stokes sveraged Type. The 900 fiscales sveraged for the such fact of the section of the Stophya, 823., Lott., Paper | L0632

3785 Gravitz wavet, 1 (dem, and compressional

waves
Homentum frankses to the Themsesbream by ATHESPRESE Times
M. toitalbeam isorving d'Adronomic du Chie, mp 3,
Nijib yestiètes-is-Enfesses, Tradeo] f. Vice
Pappagilan af the atmospheric Sides tosules io
e mertisel flar of someh wommotum. This flas e metfest flar of zonah romeotum. This flar souvergee at altitude hevelt there dissipative yragithre take place. The deposition of the me-sames contributes to the secolarists of the cambes contributes to the acceleration of the stoophers resulting in 8 case money wind. The infitted Sistifution of this sectoral on depends on the relative importance of the mechanics and thermal dissipation of for inside the first propagating mode, the mechanical distipation to a of each takes pages at 102 hm sitired, ladder an accelerating directed asstrated shore 10° letlands and westward between the equatar and 20° letlands and westward between the equatar and 20° letlands and westward however the equatar and 20° letlands and westward however the equatar and 10° letlands and westward however the equatar and 10° letlands and westward however and the ladder of the least the equatar and 10° letlands and 10° l

1/10 Particles and accords
1 How observations of Volcatic clouds in THE STRATOGRAMME OVER SUFFICE, TALSED BY EMPTRONS of ST.51, HEIZNS IN MAY 1980 M. Hisomo të partimont of Thysica, byodho Yntverally ukusha 812 Japané A. Tujiwara, T. Shibata and

Sudden forcement of attraction for a second was observed by a hid-YAC lider at the wavelengths 1,004 on FF and M-542 on FF, 3 pince June 4,100 tall time to General Persons of the increase in thought to be caused by the explosive eruption of Mr.St. Helpou in May 1980. The initial increase began at about 15 by ataltude and the acattering unite netices in May 1940. The initial increase began at about 15 bm attained and the activating sailo at the wavelength 5 reached the maximum value on lune 5. This indicates that the maximum value on lune 5. This indicates that the second mixing rail is about 70 steams non-volcanic value at the same attitude. The entertion of the vertically incident direct enter edition has been televialed to the 5xt0-2 mad 1.2x10-2 on the average for June and Juty, which are 6.6 and 3 times non-volcanic values in fail '79, temperityely. After examination of the afec distribution of detauoly inferred from comparison of profiles at the 8 and 5 wavelragehe and with data by other semulements, it may be contluded that our tidat has seen telative time and agree weeks tons of mesonois fairly well, but a little underestimated their abundance due to the assumption of clear att as the situative time she shall be a seen to the underestimation is described and the shave extinction sould be increased to 1.4x1 times. Global flightful too of serous inventory is deletiy retinated on the beats of the two disminions! energy site, tilmstal.

Sauphys. Pen. tatt., Paper | 110817

200 Fartijes and acrosols
200 Fartijes and acrosols
200 Fartijes Hamphyssel of Araborneric Afrond
Measurints - 3 sife disipisation 1974 1979
J.t. bracitevision of Cloud Physics, Csiso,
vador, Augitalian Jace E Laby
The tisstochoric acrossi particle size
distribution has feed measured at 11°5, for the
deriod 1974-1879. Sessiis from two measuring
tackniques - trastiu aingle-particle counting
and jet imperitor - agree well. The size
distribution in a chown to be described equally
well by atther a log-natual of test-octes
legarithms function - Observed distributions
agree tubulentality with model greditions for
r - 0 l to but salicate fast particles as
canils radit. Introducthous, served, southprohralyphane.]
J. Georbys, Res., Scenn, Paper 100732

Mineralogy, Petrology, and Crystal Chemistry

1200 Karayonyato, peliographa and petrogenesi 418 Janiera agana (11056) beayating in penala

- Alguraleses portabulto school of dicamaginghis Alarmania of Macre Island, Esugagon, 1-1.

He standard personal color of the anager, because of the anager o 1-F (deriges/): province of the W.J. Stran-

t. Gruphes, Pes., P. I. Pager MUASE.

5400 Carageresis, terrography, and persognants 5-1178 Partition to these continuous confine Conditions 43 A Confine Rays (Molecator P.1.8. George, forth Labracettes, Majinas, MA 621745 P.C. Hopper (Labracettestrum Labracettes, Col. 945800 M. Cipros tab P.P. Litman . (Mannet Jagene four Technical Processing Selection of the Control of th Another, second to, forcesone state, an excitor to describe the consecution both describes as a function of the consecution of a sile of the efficient of the white partitioning.

I stimutate the applicable of the model, for contributing of site of the contribution of the contribution receiving the entering table taragenesis, petrography, and tearogenesis (COMIAASTIES EVOLUTION OF (ACC-ALVALIC VALCAMIC AND BILLOGIC ROOSS OF MESIGING MINIMAMA, ALXIED U.C. Segby, K. L. Farezon (Board at Earth Stences, University of Belliarets, Samie Crus, Ca 9364) and Baryellen Cameron

The sequents of continental-art ignorous rocks occur in the Batogian used of the Steta Bades Ottidenial of north-estern Mosica. The older intiodes late Crustocous in 1ft early thousaft granifolds, and the counger is a mid-Tartlary and-site in repolite sories that is represented largely by volunious ignishrines. The latter sequence contains notes varying from 54 to 78 ml. Side, whereas the gravillatis have a sore restricted range in 510, 27 to 68 ml. S. The major elevent (Annistry of the low sequences is generally similar; however, the older granisoids have some 18780, and higher Mb/f and K/B compared to volcapic roths with elevial field. In addition, the granisalds have generally smiller in sequences, queries diorites and addition, the granisalds have generally smiller in sequences, queries diorites and addition, the granisalds have generally thaller in sequences, queries diorites and addition, the granisal shape concentrations of Bif, and higher (Ce/tb)y (5.5-7.5 vs 3.6-5.0) than the volcanic roths. The intermediate rocks of the incremental specific context, general articonation of manife derived positis ragendiarites and should be produced by fragitomation of manife derived positis ragendiarites and should be received as the produced affort nace device of the produced affort actional crystalities in granifolite, chyolites, polyogenesis.

J. Ecophys. Bon., Rel, Paper 180752

A.60 Faragenosia, psitography, and pstroganosis MANASUL TELCCARATITE: e COLLISION ECNATURE OF INCHATORE OF INCHATORE OF INCHATOR AND PROCESS COMMISSION DESCRIPTION OF SECONDARY AND PROCESS COMMISSION OF LABOR ENGINEERS OF THE ANALYSIS OF THE SECONDARY OF THE SE

artivity was be of treorience for other laucogue-

I to ich . Bes . Fed. Pepat 1809fe

d2th februaenests of granite magnal CMEMICAL YOUTION OF 1757-WAS IN IN PROTERNION (FRPNANE OF 196 S.). PARCOLL MOUNTAINS, SOUTHASINGSA MISSOURI, U.S.A., PARL II. TRACE ELEMENT SAIR MISSOURI, U.S.A., PARL II. TRACE ELEMENT SAIR MISSOURI, U.S.A. PARL II. TRACE ELEMENT SAIR WINDOWS SERVICE, Withhalton, January 25506, U.S.A.)

P.J. soch, M.E. Scieltad

The St. Francois Munitains lighture complex of Frotendric age tonsists of hypodyssai, granite plusons intruded him the overlying regulate of similar age. Melling and crystallization models of those occil fuggetted by the field, patrographic, and major element contents are further rafined using Bb, Ba, Sr, RE (rere-earth alternit), Ih, Sc, and Co contents. There are two grounds of relatively undifferentialling distances associated with the Butler HIII calders and Taum Saul steel that could have formed by partial reling of locate could be formed by partial reling of locate could be formed by service reling to the court don't agray-wacle, or subgraywacle. The olution essociated with the Butler HII calders (mobility and Silvernine granitas) could have formed by about 303 agreeds mediting of equarts don'th, gray-wacle, or subgraywacle. The olution essociated with the Butle HII of earts don'th, gray-wacle, or subgraywacle. The olution essociated with the Butle HII of earts don'th, gray-wacle, or subgraywacle. The olution essociated with the Butle HII of earts don'the subgraywacle of the Butler HIII calders.

with the laum Sout arte could have forced by shool 302 equilibrium relting of a subarbose or ariase.

More stiticic rests of the Busiler Mill colders could here forced by fractional Crysiallization. The Silvermine Granita is internelly acrea. Crysialization af pieglocleso/bializathorn-baecta/raymalizatesistic/arcan/sphese in a reste of 0,70/0.100/0.15/0.94/0.005/0.003/0.003/0.007 from the least dillarantlated portion of the Silvermine Granita sould have forced intermediste cortians of the Silvermine further crysialization of the Silvermine requires one biotial feb begins to decrease and issa homelete, sircon, and sphese thefe increased to pracipitoto and form Ho most different lated portions. Also fractional crystallization of undifferentiated by barring-type usgras could have produced the squarms of Butier Hill-Breading-Granitalities to squarms of Butier Hill-Breading-Granitalities of Silvermine and associated by quarty, effectingly, The certify the Silvermine and business while the lote trystallizing mineral associated without less the mineral establization of a culture decrease from the Silvermine Eramite-type differentialities sequence.

The associated without cross could not have forced the verticed of the associated introduce notes. Business for credit in stilphile decrease forced. The could not have forced the verticed of the produce of the could not be sured and the stilphile decrease of the stilphile d

1. Sauphys, Orac, Park, Paper LEASO:

ASIG Proposition of minerals
MICH-PRESCUE STRUCTURE SILVY OF GIOPHIOT
Louise inview (Unperformed of Facts and Space
Colories, State Dailwessing of New York, Serry
Breef, New York (1904) and Charles T. Preville
Migh-grounder situatural studies performed
and displain at the grossmans between 1 and
and 21 loan show that the shree polyledess that
computes the structure, K(1), Mill, and Sil
decrease is regularly in size. The polyhedral
volumet of Mill and A(2) best decrease entry
is. Comparison of high-precause state-inral
clumbers of displain and feesatis labeling
of displain and feesatis labeling
of displain and feesatis labeling
of displain and feesatis labeling with storaide showing less injusted by and Mill temptession and more still cate-chain with attracted showing less introduced and Mill temptomation and some all leater-thain \$1/3 lags. Thit-calf caranters of dispation \$1/3 lags. The \$1/3 lags. This section for the section of pressure has very \$1/3 lags. Some ethics set wall for this end this pass could be \$2 op \$7 (**Mi)-0>, \$1/3 lags. Olds. \$1/3 lags. \$1/3 la 4870 Properties of minerals QUASTZ WITH RECEMBER DRAL CLEAVACE FROM Managascan C.L. Ficre (Institut für Pineralogie, Ruhr-

MANAGASCAR
O.L. Fierke (institut für Pineralogis, RuhrDiversität, A.P. loobum, Germany) R. Kulks,
S.S. Misiks rad J. Aeicher!
Anhadral quarit sints from a rein deposit
in Madagascar abouing amoord cleavage places
poratiel to positive rhomboledra e phill are
described. Only two of kho three equivelent
pairs of the form [1071] show cleavage,
sitsough of different quality (smoothness).
The best developed places its parallel to
Bratti-twin isselias, the less well developed
places do sol. We pressure small instantiantly
isduced libernal shocks to be the relocating
mechanism for rhombohadral cleawage freedures,
in combination with hydrolytic seekening and
directed stress, large smooth cleawage planes
were lorned. Since the reference of quarie are
P-faces, they have a minimum of free muriase
energy. Ve accuse the to the tesson lor
cleavage pareliel to positive recombohadral
faces. (fuaris, IE-Madagascar, vein deposit,
thombohadral clearage, structure end
alroogfh).

miroogfh). Am. Hineralagist, 66, 5-6

4270 Properties of cinurals and confidence with a special and conf

OUANTITATIVE METHODS FOR ELECTRON MICRO-PROBE ANALYSIS OF SODIUM IN NATURAL AND SYNTIBTIC GLASSES

C. H. Niclean [JEOL U.S.A., INC., 11 Operborn Road, Pastocky, MA d1869] and H. Sigurdsson Twa methods have been developed for fits micro-probe assiyals at sodium in natural and synthetic pleases that exhibit lime-dependent alamant migra-tion during electron bomberdment. A ccyogenic method is based on the cooling of the semple to -9d degress C, when endium diffusion cata is near sere. An empiricial correction method defermines the thape of the decay curve as a function of time during electron bemberdment, which under normal eperating conditions, gives intial todium consen-irsien by safrapolation. (EPMA, Obsidian gives ryogenic techniques, Alkali difusion, sodium (ots).

Oceanography

Na. Winerelogist, 66, 5-6

4762 Surface eaves, tides and see level TIGAL ENALYSIS OF INTERMITTENT ACOUSTIC OBSTANA

High Englysis of introduction of Oceanography, le Joile, California 9.093)
intermittent deld from acoustic trensmissions (hourly or bi-hourly every third dat) to de obtained in an acoustic tongraphy separiment in 1981 will be enclysed lar lides as that the lides laffert ran be regoved. Two methods of anelyzing the Lides (i) lidei interdalation ecross 72 hours to patch las series. Fallowed by residese anelysis, end (i) harmonic emalysis with representations for interterence by nearby constituents. Save been lested with a real set of acoustic erfeeded dhasmadels. The results by the two rathods are lasted to the total constituents. Cauphym. News. tett., Paper Itol29

drag instruments and Lechniques

APPLICATION OF 9025 VISIBLE-ISTARRO DAIA TO OPAMITYTISO MESOSCALE OCEAN SURFACE TEMPERATURES

O. Rull (Mational Oceanic and American Administration, Atlentic Oceanographic and Mittarological Leberatories, 4301 Rickgabacker

Causesey, Hiami, Floride 331491

Application of GGES archived dals to determining sea surfect Leoperature in the Buif of Matico it investigated for October 1077, a period shea low research ships and three oet promentel house vere scallable to provide surface callibration dals. A theoretical arror analysis is first used to explain the persistent differences between ship and operationally-dericed astellita temperatures, and thes le used to dictabe a bechnique for applying fell resolution drahina GGES cisible and infrared data to the problem, the lethnique developed first memps the satellits scanline date into e rectangular maintain corrections are fitted for a serial station are performed at asch "cloud-free" station around the 9uif's periphery esing LONIANA-4. Third, least squares polymonal surfaces of atmospheric corrections are fitted to the partnerial surgary and the serial serial sets, is used to objectively classify class ocean rediance measurements. Fifth, the GGES is callibrated by comparing la altu mectoriament feection, which these claud-free areas a training sets, is used to objectively classify class ocean rediance measurements. Fifth, the GGES is callibrated by comparing la altu mectoriament sets, six probably far george and an arrive et described by comparing la altu mectoriaments and the service and anylinomental surjusted theoretical seasor and seasons and the leoperature determined by the above ontilled opproach set 2 Los Went mains with talcivitated theoretical seasor and the leoperature determined by the above ontilled opproach sets the two lacing against anylines of the lifety and military errord, and that 2 Los or slightly less it probably the geophysical lifety of accuracy.

4799 General or miscallaneous COASTAL SUBMARINE HYDROTHERMAL ACTIVITY OPF NORTHERN BAJA CALIFORNIA-PART 11: EVOLUTIONARY HISTOPY AND TEOTOPE GEOCHEM-

OPF NORTHERN BAJA CALIFORNIA-PART 11:
EVOLUTIONARY HISTORY AND TSCTOPE GEOCHEM1STRY
V.M.V.Vidal (Inclined do investigations Eléctricas, Aportado Postol 475, Cuernavaca, Maraísa, Héxicol F.V.Vidai, J.D.Iseca, A gacchemical modal of the Punte Bands
submarine hydrothormal system [FSS93] and
finenada quedrangle aubastial hot opting
18 developed using [10]/10, D.M. 185/12,
18, water and yeas chemistry. The PBS98
mater is e primary high temperature, soid,
reducing reaction fluid of ald secuster
orighn which has been titrated by rold,
alkelins, groundwater of meteoric origin.
The final exiting and member calutions
rappesent a 1:1 mixture af the two primary mixing somponents. Yn contrasi, the
submeriel hot spring waters are pura matearic water. The submarial hot spring quaio predominantly olimospharic N; while the
488HS cantains largo amounts of CH; and
N; derived from tulpad martne sediments
of Cretosaous age. 'S volues of sampled
hydratharmal waters as similar to Cueisreaus marise suffets values and suggest
the waters contacted Ctatecous matina
sadimentory strota. The presence of the
Allsites and Posarlo marine saddmentary
formations of Cretosaous age vithin the
Ensenado-Punta Bonda quedranglos tanders
support to this hypothesia. The deta
also demonstratoe that pyrite atersiyescles and deposition in submarine hydrotharmal environments results from the
complexing af fertous tran with slemantel
sulfur and sulfidals and that submarine
hydrothermal octivity sete as e major
source af silice, Cel's and trece matis
sad ee o major eink for seewater Mg2* and
30]. [Bulkmatina hydrotharmal activity,
gaechemistry, lastopos, avolutyon].
J. Geophys. Res., Bad, Paper 18103t

Particles and Fleids— Interplanetary Space

2110 Connic rays
tossilatios of the countr-ray intentity wills
SCLAN-TERRETSILL PARAMITESS
J. R. Josipii (Oupersont of Finnesary Sciences
and Astranomy, Sulversity of Stinces, Tucton, Az
STII

The and Smart (1981) have shown they the correlating Saturent to Mr. Semilation neutron monitor
counting tals and the geometric as index compass
significantly from the elevan-year period context
an one saler minimum to the next such pariod.
They suggested that this may be semilitation of
ramele-ray Stift in the leterplanetary magnetic
(leid. Yhis letter reports 15e results of numerical simulations of countr-ray modulation, inclualing difft, which welfy that drills can indeed
preduce the same of the abserved effect. Factorbetions in the beligaspheric equatotial ragions
effect getactic countr rays abserved assist
effect getactic countries fined is lower these
in the beligaspheric field is lower these
if it is autward. Percorbetions in State subsingtially more affective than perturbational
into salet else velocity or in Eq. (Drife, suchulent, geomsgetic lodices). lance, geomognetic ladicant. Ocaphya, Ras, Latt., Proce 110870

5310 Coente Rays EMIANCEO COSMIC RAY ANISOTROPIES AND THE ESTENDED SOLAR MATRIC FIELD D.B. Seinsen (Department of dhysics and Astronomy, Solar Mainter Field

D. B. Seinsen (Department of dhysics and Astronomy,
The University of how Morico, Albuquarque,
New Maxico STISI; T. fello and B. Mart

Satto's two healsphere model for the threediagnoloms; negments structure of the inner helicsagnatosphora is used to detarmine the existentials
of the two solar magnetic healspheres. Tals
orientacion, es visued from the serth, varies
throughout the year. The orientations during 1974
ers prosented, and are confirmed by sessitits data
for the interplementry sagnatic field. These data
seggest A role for the field component perpenditular to the actipute plane, \$0. In giving time to
consider may enterropies detected at the serth.
It is shown that an enhanced solar diurnal revistion in casafer my intensity at the serth tee
scies from that an enhanced solar diurnal revistion in casafer my intensity at the serth tee
scies from the tamping the paint degree of the
shown that the templementary against
field. This is demonstrated using cosaic ray
data from the Nagon sume telecape, end underground much lisecopes in Solivis, Debudo and
Socorro. (Cosaic rays, solar and interplementary
segments field).

J. Geophys. Res., Sius, Paper 1A0985 J. Geophys. Res., Slum, Paper | A0985

2000 Electromagnerir rodlesion A SEARCE FOR INTERPLANTIANT He SI, 304 I EMISSION F. PETERSE (Spece Science Laboratory, Daiversity of Callyarola, Sarbeley, CA 94720], H. Fahr med

f. Persece (Space Science Laboratory, Duiversity of California, Barbeley, CA 94720]. E. Fahr and G. Ley A taging of the sky around the antisolar directical in the Serth's shadow ese systematically surveyed lar the first time at high semitivity and angular resolution by the extreme electricals tarascope on the Apalio-Boyse mission. The signal iron the 170-620 A chemnal of the fostrument, which is essentially a primarily to the Est. 304 and He 1, 244 A response times, shows a sharp decreased in injunctive as the line of eight was allowed the shadow region. Once the line of eight is completely contained which the shedow a small residual signal about tostrumental background and independent of view direction on agreecreft position by otherwed. Its intensity is consistent with the sepected signal from the interplanetary He 1, 354 A smission measured by the 200-790 A channel of the ancreas alreafolst islessoops. As upper ifall at the 20 coeffeed lavel to e possible He it, 304 A compoint that rem encaps desarton by our instrument cores—ponds to 0.01 Rayletghe (i.6 e 101 photous cardinal contents of the contents of 107 lone cardinal card pends to 0.01 Rayletghe (1.6 e 101 phonous me el erl) or to a calumn density of 109 lons commentative of the contering at lies canter. This flux could containable by a number of ealeston accretering at lies canter. This flux could contained the contained of the contained of the contained contained the find that the two such animals more likely to approach the observed limit may satisful entered the contained that may satisful entered the contained that may satisful entered the contained by photological action to the satisful entered by photological action of totarestellar sourcal He. For the larter correct, our upper limit can be seed to have a contained that of 109 set to the section of the suprathermal He amintary to upper limit of 109 set to the section. If the opposite is true, the upper limit between 107 sec. Those high values conflict with tomocoly believed theories of the anderlying relaxation process end thus a dreate rayleion would be received if a 104 integrity of 0.02 s.le rosprocess and thus a drearte ravision would be required if a 304 & intensity of 0.02 s.le ros-J. Geophys. Res., Olus, Paper 1A0874 .

5160 Solar wind interaction with soon and planets. The PISTANT BOW STOCS AND HADDETOTATE OF TRUES. MAGNETED FIELS AND PLASMA WAYE DESERVATIONS. C.T. Bases! (Institute of Goophysics and Flanetary Physics, University of California, instancy, California, Inc. Angeles, California 90024] J.G. Lubeand, S.G. Siphio and Flasma St. Scarf.
An equalitytion at the mannetto field and plasma.

Angeles, Chifosels 90024 J.G. Lumand, S.G. Sighto and P.L. Sentf.
An essaination of the magneto field set pissus any dess obtained by the Ptoneer Vaccio orbiter in the make ragion behind Yanus disclosus a sell depeloped box shock whose location in stallar, so that observed on pravious missions in contrast so the daydide box chock. Yangatelpo hab: while the field arranged depeloped magnetopical in which the field arranged is entended, over magnetopheath values and to which the magnetopical field is eligned approximately with the college with direct the college with direct to the feel of the college with the field of the places was appointed by a things in the places was appointed to the college and the college with the college with the college and the college with the college and the college was placed. The box shock!

and solar wind magnetic fields
of SECTOR SYPERTY ON THE POLAR GEOMAGNETIC FYFELD
RY WRIER
1. Merushize (Sigh Allitude Observatory, NCAR,
1. Merushize (Sigh Allitude Observatory, NCAR,
1. Merushize (Sigh Allitude)
1. Merushize (Sigh Allitude)
1. Merushize (Sigh Allitude)
1. Merushize (In winter, are searched with
1. Mills parespanded of the polet geomagnetic stations.
1. Merushize (Sigh Allitude)
1. Merushize (Sigh Alli

1179 Solar wind magnetic floids
MAPSETIES OF MHISTLER-MODE WAVES
BETTEN 0.3 AND 1.0 AU FROM HELIOS
OSSENATIONS
H.b. Bainroth (lostitut für Geophyeik
ned Meteorolegie der Techniachen
Seiverlität Bausecheeig,
D-100 Leumachwaig, Gormany) end
f.M. Neubause
A stody of segnatic fluctuations in
faselst wind in the distance renge
free 0.3 to 1 AU and the frequency cange
f. fat - 2.2 kHz by the Technicel Uniwestly of Brausecheeig search-coil esgMinester Superiment onboard Holios i
ini 2 ducing the time intervals from
Berechet 1974 to April 1075 for Helias 1
and January 1976 to Mey 1970 for Melide 2
litids the following results:
L. Neer 1 AU alactromagnetic weve modes

I.) Neer 1 AU alactromagnetic weve modes etc restricted to frequencies iesa than 270 Hz for 091 of the time. In-side 0.5 AU the evens ere restricted to less then 470 Ho in 941 of eil

cates.
[.] Far a spetiral donally /P(F) = far a spetiral donally /P(F) = far a vith the questity /P measured in ol//HE the spectral index a verlae between -1.4 and -2.0 with a most peobable value of -1.7 and a slight tendency towards etcaper spectra beautiful the sun.

peobable willo of -1.7 sod e slight
lendarcy towerds etespor spectra
towerds the sun.

1. No cleat corroletion belease simple
please parameters end magnotic field
magnitude F on one side and spectral
densities an the after side is found.
The proportionality between epectral
dentity and F is simply etrributed
to the redist verision.

1. High wave intensition accur in the
releity of stream interfeces with e
decrease to wave intoneity with increating distance from the etroen
interection region.

1. Heantle field energy density above
4.7 Ht veries between 5x10-10 org/cm
ent to 14 ser/cm with a maximum of
accurrence of 5x10-10 org/cm neer
1 AU and 1.6x10-10 arg/cm neer
0.1 AU. The values are therefore
orders of magnitude below the total
eaguetic field energy density.

3.1 he flutuations era tentetively
interpreted as locally generated
whisler waves. Isolar wind, magcatic Spectre, whisflor-mode wares].

1. Caphys. Iss., Alue, Preer LAGSE2

1. Cuphys. Iss., Blue, Prper LA0582

Hits Soler wind places Hits Spread Solak United Hits, 1 High Toke 15 Kidh Spread Solak United Hits, 1 High Teature And Bulk YELOCITIE?

3. 6. Kitshell and 2. 6. Resiof (Applied Physics Losinoty, The John Hagkins undiversity, Leani, Karyland 20510), W. C. Feldman, S. J. Bane rd b. 1. Villame

Tennal relocities v. 2 (2X7/e) and magnetic rude-signed bolk flow velocity locreosate in the signed bolk flow velocity of the Kalifat Jarretties Experience in Last hydrogen fluts search section of the Solid State of Av. 4 V. and V. 4 V. 4 A shere V. I have the search section of the section of t

DETAINED ANISOTRAPY UNSTIBILITIES DRIVES BY FAST? 101 MODEL.

T. LEVINGY SEASACONDARY UNSTIBILITIES DRIVES BY FAST? 101 MODEL.

T. LEVINGY SEASACONDARY DETAILS PHYSIOS. Oransfir. Na 2071;

For plants instabilities drives by proton impurature and sotropies are inresigeted threstearly asing Mengis has model. t.e., the flux-soulfies moon-Reswellian valuably impulsation functions. The linear disperties practices are model of in an infinite Viscovians where the proton distribution to easued it cannot of eas worm alove speed occapoent and the street of the proton distribution to easued it cannot of eas were alove speed occaponation to the services are chosen soconding to thems's color will los and: it is shown that the fire nose, sirve and Herric instability so not oncour under the calculation mode. Growth rights are found to the calculation mode. Growth rights are found to can value abstract 2.1 · 10 · 19,71 = 21 and in the calculation mode. Growth rights are found to all the the transfer of the calculation of the color of the calculation of the color of the calculation of the calculation. The social of the calculation of the calculation of the calculation.

Light of the calculation of the calculation of the calculation. The calculation of the

J. teophys. Res., Blee, Fader 140743

THE SETT WISE PLANE.

ALTH-SPACECIANT OSSERVATIONS OF RELIGIORAPHIC LITTLES -LINGINGS TRUCTURE IN THE SOLAR WIND Rand J. Modes, Jr. and Edward J. Seath the factor of th the mains of solar yield stream observed prior to
the mains of solar syste 30 has been ended at
the mains of solar syste 30 has been ended at
the mains of solar syste 30 has been ended
the main of solar syste 30 has been ended
to the location of Mariner's and
both we saking size transcas messeruments as
low held size in the location of Mariner's
bith we saking size transcas messeruments as
low held start reverse location of Mariner's
low at the two latitudes were then overs-corretions at the two latitudes were then overs-corretions at the two latitudes were then overs-corretions at the real start transcas maintain of
the solar corrected overstand one showed only e
status can sure at these separations showed only e
status can sure at these separations showever,
significant atteraces in velocity with leatiness.
It is the separations ranging from 3.5° to 6.5°,
significant atteraces in the hygh spend structure
if and the separations ranging from 3.5° to 6.5°,
significant atteraces in the hygh spend structure
is on the stream structure of the sun,
the separation of spatial from temporal survictions
the superation of spatial from temporal survictions
light-is and lower-latitude Mariner sew a
the structure of the survictions and possible
which is the lower-latitude Mariner sew a
there is angle of 70-60° yron spier north-mouth
is factors. These stream structured Mariner sew a
literace of terpa real structurer was also seen
the alternal of larges temporary, lowed conthsouth value by Tudionia, or vied ghasts, cauging
foad for this had been and solar to the idenreal structured of larges temporary, lowed conthsouth value by Tudionia, or vied ghasts, cauging
foad for taking by foad outthe lower-latitude spates of the idenreal structure of larges temporary, lowed conthsolar large terminal structures of the idenlatitude of seyral inspectors of the idenreal structure of seyral inspectors of the size of the
like of the second of the second inotes of the size of the
like of the second of the second of the s , Bles, Paper 14068d

Particles and Fields-Ionosphere

2505 Airglow
OSSERVAYSONS OF THE CA* THILIGHT AIRCLOW FROM
HETGRENIATE LATELS ON INTERACTION
C. A. Saply (Space Physics Research Laboratory,
Department of Aircapharia and Ocasic Science,
that waresty of Michigan, Ann Ambor, NT 46109)
J. O. Mathews, J. S. Marinacher, Je., eed
J. C. O. Nather
Applicant loss of complementary, 10.

Application of somplementary optimal out inApplication of somplementary optimal out inapplication of somplementary optimal out inabecent matter redset modelings but farsoched
the presence of Ca² in lowe thermospheric latermediate tayers over Araciba. The sittude disribution and density of the calcium indiacattering with soier depression angle while the
Aracibe f 30 MHz redar manuscal election dessiries.
Comparison between the Ca² and election dessiries
committee indicates shet the composition of low
altitude losermediates lagare was \$5 Ca². This
makes is complement with both rocket mean spectrometer measurements out with the redactine some
tentrarion of calcium exposend far measure
tog both possible mightime tropical E-region
ton tast in courses and matal ton eleculation to
the tropical thermosphere.

J. Gasphys. Ras., Blus, Paper 1A692d

5518 Auters
ACCELERATION OF HEAVE 1985 ON AURORAL FIELD LINES
H. Ashour-Abdalis | Institute of Geophysics and
Fisnolecy Physics, Univertity of California, Let
Angeler, CA 90024] H. Otude and C.Z. Ornes
We dresent results of both a linear and a conisnocc study of oxygen cyclotron waves end the
setoclated oxygen heafing. Linear theory gedicts that oxygen cyclotron waves will hive
wealler greath rates Linen bydropen cyclotron
wares. Results of a slealetien study is which
tha free easing source is an initial drilling
electron distribution indirets that oxygen cycloten waves only grow to small amplitudes, while
the hydrogen cyclotron waves strideve larger smplitades. In an attempt to model arger smplitades. In an attempt to model acre reliatically the rentinuous lancegneris mustion, a simulation model is used, in which the electron relocity distribution is maintelned by a rentlen
floe of electrons. This latter model predicts
that the expense once great to amplitudes much that the angen earet gran to amplitudes much larger than the hydragen vives resulting in the draferential heating at the husvier lant.

5530 Oigh-latitude lonespheric cutrongs
FFSLO-ALIGNO FURERINE AND THE STRUCTURE OF THE
EVENDRAL COME 10005PMERE
A. Mrufiva (Rarabarg instituse of Astrophysics,
Sationsi Resperts Council of Canada, Ottowa,
Canada Rie Ozbi
A general tornula sugressing rise deceity of the
sagneste itsid alignof cutron (FAC) in a particily ionised ges me a function of other pavaical
peramafers is derived and the approximate form,
suitable for lonespheric atudies, in discussed.
Changes of the Each in the lonesphere depend
on the proparties of the vector C representing
the total mechanical lores acting on a volume of
a multi-respondent lonespheric "finid"; div ja,
and consequently div ja, is different from accutions and vil Securi 2 0. Meating of the systeral lonesphere, and a high-alifued ephonescus
of the atrospheric densiti associated with 11,
produces verificity of the G-lived which is a nonitale with the politers of the delay of the system

The londphere.

Varieties of Linthe sureral innersect. Is determined from the patrent of Linthe sureral enderthe determined for the formation of Linthe sureral lead one law.

f. Goophys. Poe., hime, Paper 140054

S500 High-Isitude Isosephett Tursenis
OISTANT MAGARTIC FIRES EFFECTS ASSOCIATED WITH
BIRTIAND CHEPRYS (WAR PORSIBLE BY DE
SYMBORITO FIRES (WAR PORSIBLE BY DE
SYMBORITOS OF A FOLORS AND S. Fevin
ITHE Johns Hoptins thiversity Applied Payeles
Laboretus, Learsi, Merviand 208101, enf H. A.
Saftakos

The magnetic tield date acquired by the TRIAD
setallire sometime show vertailons with prilods
longer than ten almutes sod with amplitudes of a
lew thousand mT due to stillude cavitations.

Free a sindy of 150 passes, the principal
cetilizes on TRIAD have been identified as
the well known librations of a gravity
stabilized setallise. The libration periods are
approcrimetally Ty2 and Ty41, whate Ty is ab
orbit period of about 100 minutes. The
magnitude and dates of these librations speed
to change over periods of a lew dags, and some
times vacish altogether. Using data equired
over several tomescutive TaiAD arbits, these
syttude revisitance tab be nonarically evaluated
and removed, instance the tail disturbances abeclared
with Birhaiend currents. The establishment of a
"been-ling" for the TRIAD arbits, these
stitude training the disturbances abeclared
with Birhaiend currents. The establishment of the
Cartenttran" magnetic titled disturbances abeclared
that a proliminary avaluation of the "currenttran" magnetic stald disturbances abeclared
that a province of the trans a squired from
these consecutive TRIAD peases (agencing more
than 3 hours] show marrly the same magnetic
disturbance groftic voich extends as far as ten
degrees in leitude from a single (net) region i
directed current sheat. These observations
conlite the persecute and global nators of
intege-scale Birkaland outrents.

J. Geophys. Ess., Siue, Faper 1A1074

J. Geophys. Ess., Sius, Paper 1A1074

5-50 KEIERS WAVELENGIN PLANKA INSTABLETIES IN
1HE ROMADGIAL ELECTRONET 3. COUNTER-ELECTRONET
CONDITIONS
C. Hemuise and M. Crochet (Laboraimira de Sondagas Flactromagnétiques de l'Environnement Torrastra, Università de leuten et du Yar - ta
Giponne - Bd des Armaris - 20100 Toulon, France)
Heasurementa af planea instabilities in
the equaturial electrojal with MF sand WF redera
bara bear always parformed in a large Kole
turbulant medium. It is only in the satuptionnal tame af a strong daytime counter-alectrojet,
as observed in Afrila in 1977, that the backare observed in Afrila in 1977, that the background to be considered as almost imminer.
Chersterielits of the instability during such
conditions are prosected and appear to be completally different from thoso observed during
electrojat condition: I especially the easeured
phase velocity varies with elevation angle and
eors length as predictad by the linear themry.
The laval of turbulence deduced from the seesurements is found to be weakey than during usual
conditions. Comparisons are made with theoretical
words.

J. Occophys. Ses., Slee, Paper 140678

5560 Varticle Precipitation
SIGNTING OSSERVATIONS OF 8.2-86 KSV ELECTRONS IS
THE STORY ATLANTIC AMONAL! MADE BY AUGISTHERE
EXPLORER-C
J. A. Oladhil' (Laboratory for Vincetary Atmo-

In a such a such a such as a such a s

Izvestlya Physics of the Solld Earth Volume 16, Number 2

Moledoneky M. S. Os excitation of normal modes of the rotati Lukk A. A., Nersesov I. L., Yunga S. L. Temporal variations in of Gorm region. Kopnichav Yu. F. Stotistical models for goveration of code and results of their joint interpretation. Shtemanko Yu. N., Toybulaky V. I. Ellicioucy evaluation of se Strakhov V. N. Equivalence in growity inversion problems and one for interpreting gravity onotables. I. Blokh Yu. I. Estimotion of magnotic field for two-dimensional rily shaped hodies including domagnotization effects. Vonyan L. L., Serdichovsky M. N., Vnsin N. D., Okulcesky B. On normal electrical resistivity atructure within the Earth	d Lg phoso and the sisinic cystems possible implicationisotropic orbitra-
SCIENTIFIC COMMUNICATIONS	
Simakov G. V., Trunin R. F. Shock-wave compression of minor Burymakoyo R. N. Fault-propagatinn velocity within on earthqu Burmin V. Yu. Coovex-splice approximation of a seismic travel Mudrelsovo E. A., Dorofoyov I. F., Tseiov V. I., Filatov V. G. Ar of gravity field into lower half-space by rooms of regulari Afromov L. L., Beickon' V. I. The offert of machanical airosse tea and critical field of ciagle-domain particles	nako sourco I-timo curvo Intlylic coolinuation Isalion Pa on magnotic sta- Isanetic energy den-
CINIONICLE	
Episoijova A. M., Yurov Yu. G. Efficiency and peropectives o	f solsmic refrection

BOOK RRYIEWS

Aioshin A. S. A stop forward in right direction. (aSolsmic methods in ongineering geologys, by N. N. Gorjayinov and F. M. i.jakhovaky.)

Minimal destroy contagnation for the property of the confert AI is a bullet superforing to the confert AI is a bullet superforing to the confert AI is a bullet superforing to the confert AI is a bullet at the contagnation of the Airor banks, Alaska 98701, U.S.ell Debreations of the Airor banks, Alaska 98701, U.S.ell Debreation of the Airor banks and the probability of the Airor of the probability of the Control of the control of the Airor banks and the probability of the Control of the Airor banks and the Airor banks and the Airor banks and the Control of the Control of the Control of the Airor banks and the Airor ban Ciffical Propognia was dults, of body in a reform, authorized, Engine III distribution of any oral observations of

5590 Instruments and Lachniques ELECTRON TERFERATURE MEASUREMENTS BY THE PLASEA LINE TECHNIQUE AT THE PRENCH INCO-HEACHY GEATTER PAYAR IN THISTER

PLASMA LINE TECHNIQUE AT THE PERMAN INCOHEACHY GRATTPO PARA PARILITIES
M. FORmen ICENARG, by 16. 18102 St Warrin
d'Hêtes, francei G. Lejaune, T. Hagfors
and P. Beuer
The results of separiments sized at the
determination of the election leaperacute
by a please line ischnique are presented.
Using the muttistalic capabilities of the
Ptench incohitant-Statiac rader, the pleamailtene fraquencies ears elaultaneously
measured ast two teaching stalians in Hende
and Renrayl at the altitude corresponding
to the assioun at the P-layer. Offferant
please line trequencies are ressured because of differant effective are resulted
that appear in the interest term of the
plasma dispersion calation. Se derive and
apply two dets enalysis pracedures that
that appear in the interest term of the
plasma dispersion of the reasoured
frequency differens to that fraquency
difference. Compatison of the reasoured
frequency differens to that capacitate
using the lon ramponent slectron temperature deronstrate that the placen a lime
could indeed he used to determine the
electron temperature at a trang dependents
of the engle between k-vactor ens maquatic field to absermed in agreement with
the theory. The future developments of
this tachnique uith the ESCAT reder fariilles ore dissussed, thusheuent stattat,
plasma line, electran temporaciurel.
J. Geophys. Ess., Suo, Paper 18877]

Particles and Fields-Magnetosphere

2702 Now shoch waves
UPSTREAM EFFECTIONS AND ELECTRONS; BJW SHOCK
ASSOCIATED OF MACRETOSTREAM CONTINUES; BJW SHOCK
ASSOCIATED OF MACRETOSTREAM OF LEITETFFSTEINCH Physit, 0-8048 Garching, U.-Germany)
8. Morsaindt, P.M. tewirth and S. Glockler
No bern smalysed 35 proise bursts observed with
the Kar-Flanch-institut/University of Masyland Ne here mealyeed 35 peoiso bursts observed with the Kar-Planch-institution throughty of Kapyland samtor system on 12EF-3 for epatress of the semin's bow shock. These upsirems bursts left lots distinct the process of the semin's bow shock. These upsirems bursts left secondologically seminated bursts left secondologically seminated up to energia a 300 keV sud higher and hands over lowest loans smagins 1 to 0 eVY. The second group, which is unaccompanied by nocegair electron herets, satisfies species which is surely with a repossumed by supercise which is no very well he repossumed by supercise which is nearly with a smagnatist of the seminated with an interest the same e-feldies appray of ~ 15 heV. On have amplemented them date with semeranate obtained with an identical sensor system on 15km-1 close to the bow shock or within the promagnetic felli, threader 18EE-1 supercass of the bow shock and 18EE-3 observes a here of group 3, 18EE-1 observes diffuse error or highty emfancing is a sensor supercass of the state of group 1, 18EE-1 observes the sides seem to highly emfancing is a sensor supercass of the state of group 1 is of negative state. It is suggested that group 1 is of negative state, Sins, Papan 141026 J. Geophys. Res., Sins, Papen 1A1026

5710 Solar aind megnetit fields
THE COMMAL AND INTERPLANETARY CORRENT SMEET IN
EAGLE 1976
L. P. Burlags (Goddard Space Flight Centres, Laborator) or Extraterrestriel Physis, Graenbell, MD
20771] A. J. Hundhausen and Zhoo Jua-pe
A topper less of Heligs I Bod 2 observations of
the interplanetary sector pattern in early 1976 with
the masimin brightness curves let he K-coronameter
that at 1.57 about the latter may be identidate at 1.57 about the latter may be identidate at 1.57 about the latter may be identidated at 1.57 about the latter may be identidated to an accuracy of sid. Inc neutral line
computed by Hitcax of 51, (1990) from a potential
field model, esting a lia-month twratge of ME. Affect
photospheric magnetic field meaburements and z
source surface at 2.50, is disting in sheet to the W.-coronamiter maximum brightness curves but extende to higher letitudes. The Helios observations give better agraement with the K-torammeler arryes for

the one solar injudical am which a lost of the lat-liarde extent of the neutral line was possible. He represented regular and the define data star into projector begalars surface profitely extended to also in the morthern health large and to site in the synthem heatthern, with lattle change freewest. 1.5% and 1 Milliars was served squared and from a simple tilled plane (a diselect configuration) symptotics is should be a served a spaceholder confi-tation. 1 No. P. H. Satoren at 1 No. No. 2014.

Option (10), P. H. Scholmer and I. H. Scholmer, But on participation payon belongments expect about, Scheme, in press 42.27. The safe of Money of the Paper 180 F

MID clusted fields INDEX 09 JOANNAMED OF ENGINEERING THE SECTION OF MEMORY 2006 CHEED FOR STREETS 2 SEATS 3 COMPARISON.

INDER CONTRACTOR ENGINEERS AND TAKE TO A SECOND PROPERTY OF A SECOND PRO

DISCIPLING OF FOLAR-CAP POTENTIAL LAGO ON INTERPREDICENCE OF FOLAR-CAP POTENTIAL LAGO ON INTERPLANETARE HARMETISS

1. 8. Retif (Unpt. of Space Physics & Astronomy,
tire University, Nowaton, ferms 770-11 8. V.

Iffin and 7. W. Will

We have computed the convection polential dropactors the poler cap from Cats obtained on highincitnation low-attirude carefiltes the-C. AE-5,

1-1) and correlated those potential measurements

with vertous combinations of parameters measured
giavilaneously in six upstares solar wint. These
combinations display—wind passevers consist of
predictions hased so magnetic weiging theory and
suggestions based on eartier empirical work. We
fird that the both of the potential drop, and the
vertaition with teterplanetary magnetic lield
[IM7] parameters, are emicrocatulty predicted by
maging theory (to the accurate with which they
can presently be measured; but that a signifirans Thactaground potential drop 1- 35 EVI dose
not depend on the parameters and may thus be
sitilibuted to an unknown process other shan
mesting. Our results indicate that small values
of the IMF are amplified by a factor of 3-10 er
the dargide magnetopause as a combined effect of
low shoch toupression and the Dan-MoSS depiction
layer affect; considerions between 500 personness
and the polar-cap potential drop are desantically
lagroared when this amplification in taken into
account. The potential drop is beser carrelated
vith IMF parameters shan with geomagnetic accivity Indires, presumably because the Satesr essiferted by mon-linear reprocess of the sugratosphere to the potential deep and the Satesr essiferted by mon-linear reproces of the sugratosphere to the potential deep and the Satesr essiferted by mon-linear reproces of the sugrato-

sphere to the posmr-cap hapat. J. Gasphye. Res., Slue, Faper [41042

ITLE Magnetopene

INCH-1, -5 AMS -5 OBESEVACION OF THE INTERACTION

RETHERN AN ENTERPLANETARY SECON AND THE ENTER IN

REMIERN AN ENTERPLANETARY SECON AND THE ENTER IN

REMIERN AND AND THE SECON AND THE ENTER IN

REMIERN PRINTERS. A RASED THE METALL OF THE

REMIERN PRINTERS. Unfairfully of Californie, Los

Angeles, CAE, M.O.B. Weedsor, C.Y. Russell, and

E.J. Peith;

The lateraction between an intemptementy

shook and the centh's magnetosphase was observed

by 16824 and -2 on August 57, 4578. The two

specantage are inisissly leads and near the

nose of the magnetosphase, especaded by shout

1890 km. The about, Identified by BEEX-1,

resched the afointly of the Seath in

approximately half are hour. As a result of the

letismotion the asymptophase and the how shoot

legicity dettheard, so that Is feer than three

cleates both the magnetophase and the how shoot

heads over the SHEM-2 and -1 specanter 1. The

letiny between the two speckedt yielded e

boundary appead of 184 km/sec for the

asymptophase. This among toward ity large speed dainys between the two spececheft yis ided e boundary speed of ligh Raykov for the segment pages. This except locally large speed provided a rapid scan of the boundary et the tiss and place of observations but important differences is boundary elluciete astated to dark taken 5 seconds apart by the two pagesousse. A rosetional 2010 wave second present during the 2252-2 causing and absent duting the 2559-1 cronsing. The magestopasse thirtnesse upe found to be 250 hs at 1522-2, and 150 hs at 1522-2. The date inclusived boundary structure on a scale of 176 hs at lace, and/or high frequency is 0.21 fell large smpt finde temporet verificant. These has results end inconsistent wish placed examples are inconsistent wish placed examples with docalled patchy reconnection.

J. Carphys. San., Red, Poper 180929

Sylly Augmelophuse
IVICHACE 468 MAGNET (FINIO RECOMMECTION AT 188
IVICHACE 468 MAGNETE (FINIO RECOMMECTION AT 188
IARN'S PARCHEDRUSE
B.U.O. Sennerup (Burtrauth College, Menover,
M.M. 81755, 173) G. Partrauth College, Menover,
M.M. 81755, 173) G. Partrauth College, Menover,
M.M. Stropes, G. Hestrodel, S.J. Sene,
J.R. Astridge, J.Y. Gostling, and F.T. Aussoil
Ilevan assec of the 188 is ataillised through
the frontside terrestrial acquetopause (local
line 9-17 in CSM lattlin-12 2-43 M) have been
identified, where the platma velocity in the magnetopause and toundary layer was substantially
larger than in the regressizable. This paper
satetines the nature of the plasma flow, magnetic
field, and energodit-particin flaws in those
regions, with a wise to determining whether the
value of the principal quannalic-field reconnettion. The principal quannalic-field reconnettion. The principal quantion is whether the observed difference for tengential pleans welocity between a point in the
magnetopause or boundary layer and d reference
point in the adjacent suggestance for the
it cates, the everage ratio of observed to predicted valocity difference was in the reage
O.O-1.2, alith a compatte everage of O.O. The
everage around every reconnection line (D, -0), and are (et 2, 40 M lat.) study of it [O, -0), and are (et 2, 40 M lat.) study of it [O, -0), and are (et 2, 40 M lat.) study of it [O, -0), and are (et 2, 40 M lat.) study of it [O, -0), and are (et 2, 40 M lat.) study of it [O, -0), and are (et 2, 40 M lat.) study of it [O, -0), and are (et 1, 40 M lat.) study of it [O, -0], and are (et 1, 40 M lat.) study of it is expected to its magnetopaus. All of these
magnetic date uera mostly poorly distended, but
in general their stage wave consistent all the
plasma retuils. In several cases energalic magnasospheric particles were observed outside but
adjectnit to the magnetopaus. All of these
revuils tupport the reconnection hypothesia. The
energysic particles, were observed outside but
adjectnit to the magnetopaus. 573) Magnetopeuso EVIDENCE SOR MAGNETIC FIELD RECOMMENTON AT LHE

J. Carphya. Ban., Blue, Yappr LACQAI

Eitt tisses instabilisies
NUMERICAL STUDY of ESTADSIES YEARING MOUR
SETSSILITY IS ORE-COMPURENT PLASMAS

Y. Tessess (intitute of Egate and Settocautitel Eclara, 4-5-1, Someha, Megure, Tohyo, Japami
A massiral slevisties is pastormed fo investigate line healinest phase of the rollisionists
seasing mode lestatifity. The results are found
considered with the gashinion of the theory by
Galsay, Carositi, and Ashout-Abdails, who pradivided the stistants of an espicalve phase of the
seasility results to a septicalve phase of the
seasility results to a septical of the asymete
field expension the electric sheet. Blace electroutesis affects on the swointion of its instability are onglected a peloral in the plasent nusavied eleviation, as do way obtain the Yinel
snewst. But there seems to be a good youghtility
of the trylecium avoiution of the testing mode
instability to its monitoser stage. It is expued
shat for a sufficiently long-waysingth parturharios the nonliness applosive evaluation can become faster shan see accliness coalectance mode.
At to furthes noted that the yesticles are sheedit to further moted that the particles are heated Disherirally wishin the magnetic itlends by the one-disensional comptension process. Mearing mode instability, segmette reconnection, requesti-tall, places obsett.

e Comphet Bent, Blod, Paper 199319

tiet finme instablisty LOWER-WITTD-CESTY PRETAILISTY AND ITS ASSOCIATED AROMELOW RESISTAVETH IN THE REVITAL SERVE OF EARTH'S MOCRETOFALE Zu-yim by SDept of Earth and Space Sciences, Uni-

EART 's MACHTUPAIE
La-yis by Specia Sciences, thisverilty of Celifornia, los Angales, CA 90014;
a. d. Quest, A. C. Sivisco and C. Tu

It has been suggested graviously that at the renter of the arth's yissue sheet there evists a thin
non-adistif Clayer, the neutral sheet, whose
thichness is of the order of the ton syroradius.
The low distalles for the the sproradius of this
sque sou-savellles town. The purpose of this
papes is to asserted a con-dineusions! "nonsavevillam" modal for the steady secural sheet and
to dramhos its inatability proposites with respect
to the lower-hybrid-dyisi (LED) save. A combinesion of a Boitmana dinvibotion and a madified
Alpers' distribation les kone is taken. We show
that in she isait of a thin materat have, this
distribation is a more powerful source of fees
assays then the usual drifting maverillam. It is
found that most regions within the neutral shear
ass unstable. The frequency spectrum of the ocstable waves is marry the same as in the drifting
marvalities case. As shown proviously by Suka at
ai. (1878), the Tragumory spectrum is for good
agreement with the chaverestions. The growth rate,
ass-maing a modified sipens' distribution function,
in Yound to be enheuced compared to that due to a
drifting marvallian model in a portice of the
sheet at some distants Free the mail of the field.
The asturation level of the Juctuating field and
the monacleus residivity see anies lead in the
entire aber using current valaxation as the stabiliting asshell me sod or found to be 1-4 times
assages then those to a marvallian sheet.

J. Coophys. Sas., Sine, Yaper 14091 I. Ceophys. Ses., Sine, Faper 140973

the transmission of transmission of the transmission of the transmission of the transmission of tr liens oud a tril-ward saving "magnette bubbie" or "plosmaid."

or "plasmid."

En addition, the results show that the occurseries of \$4, <0 and the shape of the sectral
times are note comples than in \$20 and its bits
the organize \$5, generally more restricted to
time and syste than steamy tailward flow. The intraces to pittes about thirbrade and \$5, teward
the flanks of the tail rauses the seriesection
and succeleration grocess to be insight be the
t-discarriab. Eathward form the asin \$-line e
discession of the state-tail outsent is found,
teling serieserd on the dawn side of the tail and
tailward on the dawn side of the tail and
tailward on the dawn side of the tail and
tailward touts to at to tay asinly separalizing to
the discatted turrent, as the fall-adjust expensents of the current result designed verposents of the current result designed on the duck
side. Free than the regreatures of region t
extends ill lime and retreated in the duck
side. If neverter shalling as greated a secondersons. side. If mouter modelling as good to seconderstont. J. Carphya. Sec., Siye. Taper 180441

5/83 Phase mption, torrestion, or tirrelation COMO/fall % Jacks Tolored COMO/fall % Jacks Tolored Como/fall % 1. W. Mill (Cepi. ol Spain Physics and Astronomy, Size University, Masslen, it 7/0011, A. J. Cessier rei L. J. Phar The lordification trymmetry of the 1g classes

Marke Collectify, Massian, 11 7/0911, A. J. Cessian and I. Shaper The localisational exponency of the localisational exponency of the localisational exponence and the second exposition and the second exposition artists in Application artists and second exposition artists are second exposition artists and the second exposition artists are second exposition artists and the second exposition artists and artists. The terminate could be second exposition artists are second exposition artists are second exposition artists. The second exposition are second exposition are second exposition are second exposition. The second exposition are second exposition are second exposition and the domination explanation for extraction and the domination explanation for extraction are second exposition. The second exposition are second exposition are second exposition and the second exposition are second exposition. saled magneloupheres, for Europie. That of

J. Goophya. Res., Slaw, Poper 140778

5760 Plasma marion, convertion, or circulation of all life interpretation of Protosa in Lugit RP's MAGALDARINAT D.D. Earling and Continuous of Coophysics and Planetary Physics, University of felilornia, Los Angeles, indifornia 900241 Us investigate a sodel by which 10 hav proton erreterated on Jovian autoral field lines are ecstioned and localized to the magnetic equator. The critorion that the beam density may be suffi

In critorion that the bran donnits may be sufficiently large to atnovate magnatomonir waves lead to the evaluation of proton beam fluxes consistent with recent Voregor observations of a hot high \$ planns sheer in its capactosphere. I redel of the Silven speed in the planes sheet for both inbound and outbound logs of the Vorager i encounter is presented. This model confirms aiddington's limit of degarture from rigid corotation beyond the point where the rigid body corotation speed equate the Aifvan apad. Finally an explore the possibility of non-allebette scentering of super-Aifvanic lone by Allabets amples the possibility is now-silabets amples to possible to be passed about as a basis for high-energy rais formation of arbient particle distributions. J. Comphys. Ecs., Shun, Papes 14,0810

BYAN Places motion, convention, or circulation GRANGEVATIONS OF SIELD ALIGNED ION AND SLECTRON OBSEGNATIONS OF SITUS SLICEDS NOW AND SLECTRON BRANS FROM SCATTLE 1918-5)

J. O. Hichardson ISparn Sciences Laboratory, The Aeropaum Corporation, S. O. Bos STET, los Angelse, CA 90009) J. S. Seunsil and d. S. Croley, Jr.

Intenso field-aligned beams of loss and slectrons have been observed by sixteenstatic smalgrers on tie SCATTA [918-2] satisfailt. The beam have needed carry sparse with contribute the search are passed errory sparse with contribute.

analyzers on the SCATA [PIS-2] satellitm. The beams have pealed rangy aparezs with controlles ranging from tans of my to mercual in. These beams show a strong local time dependence, with occurring frequencies of these beams are also positively formulated with Kp. Comparisons have been done with SI-1 observations of field-aligned ton fluxes, suggesting a direct relationship between exceleration of long as low sittleds in the surveyal region and the observations of the daily of dispersions and the observations of the surveyal tone of the surveyal tone

37d8 ileas motios, ronvectios, or sirruietios EVALITY Ot THE MAGNITIC-PUNA-1038 AND RECTRIC CULERT SECS (1870M) 88 MAGNETOEPHRAIC YLASMA ANS EMPRAY YLOW C. Athleson [Hetchetz Imetitate of Astrophysics, Bailcosi Research Downstil, Ottans, Canada) The dwallty between electric current and magneto-selts live tubes is earliend yor the magneto-selts live tubes in earliend yor the magneto-selts live tubes on a secretary description.

ontin live tubes is estitud for the magnatosphere. Nagnetic fits tubes as regarded as
fluide elements tubigat so reasons attrasses.
Derreat slowers then heromes the deal of stress
beismes and Poynting Tector energy lion a dust of
A'S dissipation. The attrasses which correspond fo
currents at a distance, and planus stresses which
correspond to foced currents. The duality
between rurvent and stress is traced for ionoapheric loo-dess forces, selnr-wied attrasses of
the asynstopiuss; leartist atlacts and the
affects of asseptic plasses on flux tubes.
The attrass beisors and dust current egatume are
easiland lor iderlised magnatospheres of inreseing respicativy. For a simple asynstophere with
no consecutive flow, the beisenced attracess are
the Chapman-Farress agnatosphere with
no consecutive flow, the beisenced attracess are
the Chapman-Farress agnatosphere with
no consecutive flow incredures further attrasses;
lancospherir loo drag, Aliveo layer shielding and
on labelance in dey-slipt asynatic atrasses;
lancospherir loo drag, Aliveo layer shielding and
on labelance in dey-slipt asynatic atrasses due
to transport of flux tubes to the nighteside by
the tolar alind. These atrasses blances and heact
the carrengooding additional carrents; the lonesphalir Juddenished currents of flips and
Potcara. The sprengy Flow in the store modeln is
dustrialed borth in carms of Poynting vaccors und
the above current systems.

Temporal coalactions camained are: (i) on
intrassa in day-slid sargling ond/or alpheside
seconsection, (ii) on increase in the energy
density of plasma in the plasme wheat, (iii) as
intrassa in day-slid sargling ond/or alpheside
seconsection, (ii) on increase in the energy
density of plasma in the plasme wheat, (iii) as
intrassa in loosepheric conductivity end (iv) on
increase and solar wind pressure. Inch of the
Virat three raquires an increase in the energy
density of plasma in the plasme wheat, (iii) as
intrassa in loosepheric conductivity end (iv) on
increase and of its recorded that flowaperical
ab ophera. Magnetia fine Subse ess regarded as fiuld elements subject so resions stresses.

aphesa, convecation). Esv. Gonphys. Speca Thys., Paper IR0915

tivo shoat-period (leas than 1 day) vaviations of magnetic field
POSSBLE CRANCES IN EATHERS. Sc 1 POLSATION ACTIVITY CRISED BY BARY

3. Sanadani, A.C. Pransr-Smith IRadions importance inhoratory, Stanford Sinteronics labourgories, Stanford Sisteronics labourgories, Stanford University, Stanford, Cailf. 94304) 0.0.

Villard, Js.

in a previous producinary study of the disreal vasintion of Pri yelantion activity at diamford during four months in 1818, evidence as no obrained yor changes in the tate of occurrence of the pelastions atomá the tiese when acreice as a tested and terminated by the ino Francisco day Ares Espid Yreas atomá the tiese when acreice as a tested and terminated by the ino Francisco day Ares Espid Yreas at (BARY) systes [Feaser-Smith et al., if 19]. The present study entends this extrins when by analyzing Pri pulmation data recorded at Stanford during 1976. Eguate engane of 8-5 geomes pantic activity were peopaved for the couplate year estimated at the internation containing Pri polantion of the Pri activity (as messured by them 18-nioute interval containing Pri polantion of the Pri activity (as messured by them 18-nioute interval on assistant was not corpally in opeation, earn tompated. Corealarions of the charved differenses and with the RAT was not corpally in opeation, earn tompated. Corealarions of the charved differenses and the produced by RAI only the influencing the occurrense at Yr 1 pelestions along the Stanford geomegnetic on tidian.

J. Cooplys: Rain, Sun, Paper Laiou.

government out idian.
J. Goophys. Res., Blus, Paper LAIGH

Syro Short-period (less than 1 day) vesiations of magnetia ffeld CLUMBIFICATION OF REPREMANEETIC RESERVORS AMEDICATIONS THAT STRUCKERS AND ASSESSED OF THE PROPERTY OF THE PRO

Sys, lapan) T. Toys, a Koins, S. Kerahim and N. Keramura.

W. Karamura.

Using 303 bydromegout is emission svenis observed in has frequency range of 0,1-2,0 Se at Syrow (LoS), EM emissions have hear rises!yied into tight entrype hased on their spectral siructanes, i.e., EM visitar, period in EM emissions. EM chorate better the majority in the section of the sectio

Nyto Wave propagation
STHALTANTOUS GROUND-BATELLITZ dESERVATIONS OF
QUESI-ERRIGBIC [QP] ELF-VLF EMESIONS MEAR L-6
S. Bato[Mational institute of Polar Research,
9-10, Kaga 1-rhose, Ylabashi-ku, Tokyo 17:3)
S. Yukunishi, T. daaki and T. Yeshine
Siguitaneous ground-satallith observations of
ELF-VLF emissions been been retried ont at Syova
statled [L/6] is Antaratise during the ISS period
by realeving the tainestry signals from the ISIS
i and 2 setallites. The gansi-periods intensity
modulation of ELF-VLF asimalous at the satultith
lavel, which had ous-lo-one correspondence with
the islanatly modulation of QC estallons at Syova,
was observed in the vide latitude range from -he
to -VDVMAR, and also in the regioe 2 hours expert
from by QP estallons suggests local ties. The spectral
form of QP estallons appeared on the ISTS satisfies
form of QP estallons observed on the ISTS satisfies
form of QP estallons of polar short while assissions in
the lower fraquency range asso observed at higher
latitedes. Although quasi-periodic intensity
modulation of polar shorus hed generally one-toone correspondence belease the ground as destallite data, burst-litt discende missione did not
abor always ons-to-one correspondence betasee the stays one-to-one correspondence betased both date. These sesults give a basic to confirm a phanemonical pela model proposed by Sato and Pusagishi (1951) for the generation mashunles of QP existings. (VLF emissions, ground-setallife

6140 Engentic and electrical propertion.
ELECTRICAL EXSISTRITY OF AIMERALS AND BOCKS AT
RICK THERMOTHAMIC PARAMETERS
8. 1. Perkhosents (Institute of the Physics of
the Earth, Academy of the Eciences, Bolthays
Grusinskays 10. Moscon C-24t. USER)
The First part of the paper, after supplying
gnarari loformation on asmiconductor and dislocative physics, describes apparamental data about
the dependence of olectrical resistivity of different minerals on their cation respectition within a mids temperature interval (up to 1100°C).
The different rherarter of dependence of resisrivity on pressure is noted for minerals with
mostly lastic rheracter of electrical conductivity
and with valence of cations of troe. Experimentel data are present which show the rhanges of
electrical reslativity of winerals due to polyearphiles, dehydrafton, and deemhonatisation.
The escond pers describes the results of study
of remistlying of wister-staturated assissatory
rocks at high pressures and temperaturer. Data
are given on the midert of perceity, possionyiguration, means compelition, concentration
of electrolite, remient of slay, type of remot
sud typs of remanastion on the rheracter of reularity p = f(p). Morooner, edsertplies is
gisson of experimental date on resistivity of different
groups of rocks on their mineral and chamical
composition and on their aimoral and chamical
composition and chamical
composition and chamical
composition and chamical
composition and chamical
composit

minoral substance.

May. Osophys. Spane Phys., Paper 120273

diss Thermal propertine
THE TEMPERATURE SYMBILIZATION OF A BOREMORE
Y. Lablame (Opertment of Physics end the Institute
of Earth end Piecetery thysics, University of
Alberte, Edmonfon, Aits., Ceneda Td7 231) 7. v.

Alberta, Edmonfon, Aite., Canada Td7 23) 7. w. Jones
Analytia solusions for the Samperature stabilization of both square and circular borsholes are romaidered. It is found these a previously published soluton for a square borshole is incorrect in that it does not reproduce the initially assumed conditions. The correct analytir enlution for a square enil, as asid as that for a circular sell, indicate a much some repid approach to the formation temperature. The temperature stabilisation curves for a range of thermal diffusivity values are given.
GEOPHYSICS, vol. 46, no. 9

digo Thetruments and Techniques
SIZE EFFECT IN ROCK TESTING
G. Bearhar | Hassachusetts | Institute of Technology,
IT Heesachusette Avenue, Cambridge, Messchweetts,
U.G.A.) E. Simerain
Bopirical rejections between mize and strength
have found ample treatment in the Illustature, not
so the effect of size on the undriving sockation,
This paper examines wise effect on fracture sechmains in tunewallined and triaxis; tests smoog intest specimens of various sizes and on jested
specimens with rerious specings. Exalisical
size affect and volume dependent strain sargy
effect trans a distinguished and are shown to
differently affect crack propagation and islines
mechanism. Bise offect, rock testingi.
Geondwa. Res. Lett. Pener 110877

6810 Atmospheres of pienerr
A LOCAL DOST GTORM IS THE CHEFSE ERGION OF HARS:
YISING ORBITAR OBERNATIONS
Yhilip B. James | Dept. of Physics, University of
Sissouri - St. Louis, bildil and Maccy Evans
A local dust arers was observed near the Silfry
Lacder | site by Whing orbiter | In Esptember,
1971, when the aveocentric longitude of the ava,
Le, was \$40° labortly before vermel equinors).
The esbitar observations, which consisted of a
time esquence of pictares, which consisted of a
time esquence of pictares, show that the ators
onewl at about 50 m/sec to the ENE from the
immes-Pienes regtor into the Chryse bests. Sath
bercefine seven and topograph may have been
essaniated aith the generation of the storm.
Geophys. Res. Lett., Paper 110937

Agin Atmospheres of planets CHIROS SECREMON ES THE TREBUS IONOSPHESS AN THE SOURCE OF THE SOT RECORDEDIC HYDROGEN E. E. Hodges Jr. and B. 4. Vinelsy (University of Towas at Dallas, P.C. boy 688, Blohardece, Yavas 78080)

Yeves at Dallas, F.G. bow 688, Bichardese, Yaves 20800)

A global Moste Carlo model of the acceptors of Yenua, saulating the cornel acceptorary processes, as mell as the production of a 'hoi' hydrogen component by charge exchange of H' yith 8 and 60, hat bean compated. The resulting at timede proyling by ahomic bydrogen compandation over hode the day and sight hemisphares are to resemble agressed with Marleer 5 and Harinar 10 charvations of Lyma W, abouting that the loncepharte charge scheeds reactions are a cigalficant course of 'hoi' hydroges, and peasthly the dominant accordance with the company of the charge scheet acceptance, the unsertainties in the available atomic hydroge dails allos for prudotiyon of a sieliar escoot of months and the processe involving H₂.

J. Geophys. Rea., high, Paper 140983

6510 Atmospheres of Pleaste
MARS ATMOSPHERIC OFACTIT OFFECTS OBJETUS IN THE
MORTHERN HERISPHERE BY TIKING ORSITER INJOING
7. Thorpe (Jet Propulation Laboratory, 4500 Cak
Orose Orive, Fasedana, UA 91109
Observations of abanglog Have contracts by
Thing Ochitor salevision remeras have provided
a description of changing atmospheria equality is
fine Bangthern Hemisphere (Faper 1). This report

sxtanda those assgurements loto the Morthern Heatuphers over a greater time paried and provides a datalled description of photosetric changes at the Lender sizes as send Yron orbit-Boflantivity shenges compared mith optical depth increases produced by four dust stores indicate sees partisks scattaring shanges with store swolution at well as substantial opecity to the forthern assimplers for the duration of early starting war.

Martian year. J. Geophys. Mes., Blue, Faper 1A1043

6510 Atmosphares of planets
FROTOCHEMISTRY OF PROSPHIME AND JUFITER'd
GREAT RED SPOT
U. May (Dept. of Coophysics and Planetry
Scleenes, Yel Aviv University, Yel Aviv,
laveal) M. Fodolsk and A. Sar Num
The mitraviolst photolysis of phosphims;
which was detected, to the Jovian atmosphere;
was investigated experimentally. A 12 migning

which was detonted to the Jovian atmosphere, was investigated experimentally. A 31 sistem of FN₁ in 3, was photolysed at 300, 200 and 77x and o yallow elemental phosphorus are formed. This exterial see anthey desk red as the was phosphorus available conservably, our was it resetty the the sell known white phosphorus. The measured shoreption speatred and YIm this bree o' this exterial ware used to compute the wavelength depredent implantly index o' regrection, while its atml index od refrection, while its atml index od refrection, while its atml index od refrection, while its atml index od refrection (while its atml index od refrection (while its atml index od refrection (while its atml index of refrection (while its atml index od refrection (while its atml index od research to the state of suppared to the protolytically reduced yallow phosphorus were computed over a wide radge of sixpa and optical thicknesses. The levelifit in the appearant of Jupiter's Speat had been a controlled with particles with a reduced the indexty ing ingrate of its about my title as figure in the early of the particles with a reduced to the protolled in the reduced the particles with a reduced to the particles with a

Goophye. Res. Lott., Paper IL0677

Planetology

J. Geophys. Res., Blue, Paper IA1828 1191 Coneral (Spanocraft Charging) OBSERVATIONS OF SIPPERRYLAL CHARGING EPPECTS ON ATS-d

ON ATS-d S. C. Olsen (Physins Department, Delverally of Alabama, Nuntryllle, Alabama, 88899), C. E. Nalissis and S. G. Nulppis Yartleid data iron the UCSD experiments on ATS-d

Yarticia data iron the UCSD experiments on ATS-d shows the esistence of an electrostatic harrier eround the ATS-d salesan package. The 10 eV to i had harelar to elemenate as the seriace around the selesce package to personal a shown to be the result of sharing on dialertric seriaces around the selesce package to personal as subserved the servations were madeled with e spherical, monopole pien dipole possotial simulation, and MASCAF, a three-dimensional, restampular code. The sealy-sis showed the ingra dish cosemns on ATS-6 could produce a 68 T berrier by charging 20 T erra aspatian then the -80 V esinframe. Chestrections of intense fixzes, carrowly confined is engis and sourgy, saus tracked so the insulating surface of the University Chestrale cetefing detector, iocated on the othershe conducting science package. (Cherging, sinetric Yinlds, perticis measurements).

J. deophys. Eco., Stue, Yaper 140641

Physical Properties of Rocks

Sild Biasticity, fractusa, and flow POTENTIAL FOR GEOFMESICAL EXPESIMENTS IS LARGE SCALE YESFS AND OBSERVED IN THE STATE OF STATE daperimental ansigner of course interactions to simulated earthquahas constailing of confined shear instabilities on a lauli with gouge appears to require large specimens (*10) and high confining pressuess (*100 Mps). Semphys: Eas. Latt., Paper 110794

dild Elasticity, fracture and Flow
STOROGEMANICAL STARVICE OF A DETONABLE ROCK
FRACTURE SUSSECT TO NOVALL STARVE
1. 9. Fasq and 7. 4. ettherapon | Earth Sulences
Civisfes, invisors attheiny Laboratory, Berhelsy,
tulifornis Syidd, G.S.A.

A simple physical model to Cavaloped to understand the affect of mores! attess on Finld Flow
through a single fracture. Roughness along the
feacture wells plays a deficite role in controlling
the lione. In the usual parallal-plate appresentation for a fracture, the flow is proportional to
the cube of the constent aparture, b. Rowesser,
when the affect of fracture roughness is eather into
screent, the Flow follows an angulvalant "cubio" len
where tens unbe of the single value for the sparture
test be replaned by as appropriately weighted averseq (6-). To obtain this average value, a physical
model awa developed wherein the steels Frecture is
suffer acture results From a Offormation of them
voide. The undel snables one to characterists the
fracture roughness from a relationship lattween the
stream-displacement measuraments of totact tock and
those of jointed each. This calculated value of
the's lende to flow rate as a fonction of normal
attess. Fradicted flow rates onleg this model as
in quod agreement with receiving from imbordary date
on granita and besatt. By sating several aimplifying physical assumptions, we have aliminated the
measurity of incorporatine fitting paraesters to
the liow data. In this manner, a basic enderstmeding of the Factors controlling the flow of fluide
through factures hee been obtained.

J. Geophys. Bas., Red, Papor 180968 J. Geophys. Ses., Red, Paper 180968

6118 Electicity, fracture end flow SOME SCZE GEPENDENT PROPERTIES OF JOINTS AND DAMATS AMALIS

H. Berlon (Terre Tek, Inc., 420 Melara Way, Selt
Ltta Clig, Utch 84106, USA)

Marked alrangin-size effects are observed when
rock joints are tubjected to shear. This is due the mobil (aslim of larger, but ises atsumly inclined saperities as sample tize is increased. The displacement required to mobilize strength it also increased by the changing size of sample. These observed size elects indicate that large texts table should be performed to obtain realistic data concerning shear behavior, distributed as disordering the remarked of the electric state of the concerning shear behavior, distributed as disordered or macrically changes. An empirical sended for numerically modelling the ellects of joint roughnets and sample tize on shear trangth each distribute of the electric state o

Coophys. Ras. Lett., Paper 110674

till Equations of Stats
HNCOMIOT EQUATION OF STATE OF
ON TABLELARS TO 200 07a
N.S. Vanelilos and Thomas J. Akrson (Salamoinjent Laboratory 236-41; California
lestitutes of Tachnology, Tanadana, CA
litst, URA)

Hav shock when data on (100) orisolad stogts
departal partalass covering the prassana range
face 160 to 200 67s suggest that NgO is
described by single Magnosto up fo 200 67s,
alts me dispinaless phese transitions of voices
rhange gratter than 1-1.5 per cent: For a third
order finite strain fit, with Ng sometraland into sitesmeelship determined soulas of 166.7
8ts, the implies Ng of 4.72 2 0.74 is le
agrament with the ultrasocirally determined
value of 4.17 4 0.14. The new data indicate a
somewhat steams Magnolot thus that congrated by
Ersylously pohilabed shock, are results under
150 GPa. A preriently published result; at 130
07s shows more respectation to the light of the
present data than undid be spected for MgO is
the SI stranture, and say signal the onest of 10 per
shows transition although we expect adort modelity sake this laterpressition. 17 MgO forms an ideal
solid soletion eith TaO, our data does one
support the occuprates of 9 significant
transition in segment down that some pantile
transityes, leading the present of the prese Pressures, Geophya, Ras, Letl., Paper 110854

SMC Limithers of Planets
[CCL NAS DUST THOSE EXPERITION HECKANISM
[CCL NAS DUST THOSE EXPERITION HECKANISM
[A. Byan (Zarkh Eclears Beparement, California
like Chivarity, Fallerton, Pullarton, CA 92d3t],
[B. Bistrass and S. D. Cocich
[CCL 1806, First Naw year of Wiking on the
Softwa, a local dast ators was observed at the
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A. The
Hilling lander #1 alts by Thing Orbitar A.
H Leothel. Res. Lett., Paper 11593d

SEMENARY MONOTOR FOURTH POSCITIVE BANDS (N THE NEW CANDOW 1). SYMMETIC SPECIFIC SPECIFICAL CONTROL 1: SYMMETIC SPECIFICAL CONTROL INCOME. SPECIFICAL CONTROL 1: SPECIFICAL CONTROL C

480 Interior of mean unit Report of the Research Half Rader-Fracture of Real and Sear C. gooleans toppertuner of fish and Planetery Eclesicae, Manuschnerte Interior of Research Resear ins R. Bead
In the program as evaluate quantitatively the
hephrels that topographic modification of
flur-fractured crears no the moon was acconministly preformably by viacous relaxation.
Until the riogle assumption that the moon
to be added as beying a tofform Mexicolian
smoothy, we recepte the observed topographic
polities for a number of floor-fractured exasistity, we congare the observed topographic smills for a surber of floor-fractured struct with the profiles predicted from the name relexation of ecopography of frash crature of alciler disorder. Bespite the simplifies of the theological model, the comparison is sitted. The floor uplift, the vim substitute, and the apparent subsidence outside the miles the several floor-fractured transact without are well annehed by the viscous releasing that a purely viscous model is not written hypothesis. Floor fractures, while releasing that a purely viscous model is not written hypothesis. Floor fractures, while releasing that a purely viscous model is not written by the selects "instante adjustment on the thin brittin licerphres. The association of monw floor-flathers fracture with impact besine and with the size of care volcanism can be understood in series of a pronounced acceleration of crater releasing to local regions of anomalously high britishes on the series and therefore of low divide viscous two and that I lichapphres. The artistive extent of releasation of floor-in twed craters can be interpreted in terms in limited rize interval of webstential relations and the present of the vision for each crater. That the interval of webstential relation for the viscousity to rise, "the sphere to thicken, and the present that we release to thicken, and the present to a releasation is a visible hypothesis to achies the topographic profiles of a number of

white raited to be "frozon in". Thus a releastion is a wishle hypothes is a colain the topographic profiles of a number of the frozon-fractaned craters, and the extent discos releastion of crater topography only the salton to map leasted and temporal substitute in the shallow thermal structure of the and other planets and noted lites.

1. Craters, viscosity, secondar.)

2. Type. Pes., Sed. Paper [Mi048]

IN Surface of planets LINITE OR LANGE-CRATER ROUTING AND CELTERATION OF CALLERY ALL MICHAEL D. Stron (Linar A Planets) Lab, University of Arisons, Tucson, Lines 187211 Among Map, University of Arisons, Turson, since State and since State and states using the Items lightest state production function and sincing enough releasation of the large octars is wise the size-frequency distribution of these callists results in an areal distribution of those creates unlike that study observed on Callisto. The sizelations she that if creater relaxation was an extensive using the state of callists octars from the lower production function, then the octars a callisto should frequently occur in clusters because the sites of the the large, relaxed makes, and appears of lightly created berealmound make the sites of the new calcased octars. Manual that is not observed on Callisto, the large highlands' production function is not been as attentive as frequently presumed. Mallisto, Danyande, octaring, creater relaxation, Note Callisto, as a sect., Paper 11984 Copye. Bas. Lett., Paper 115554

Seismology

ist Pencetts related to serthquake prediction ist 1871(18705) of GEOCHMICAL SITHODS IS REPORTED BY PROTECTION IS CHINA INT. FARCELL STREET STR inchesies andioringi.
Septys. Les, Lair., Paper 11.0589

13) Primate sources
7-50. DEPTHS AND MARKET TEMBOR REFERENCE TATE
7-50. DEPTHS AND MARKET TEMBOR REFERENCE TATE
7-50. DEPTHS AND MARKET TEMBOR REFERENCE TO THE TATE
7-50. STATE AND THE MARKET AND THE TATE
8-1. YEAR AND THE MARKET AND THE TATE
9-7-50. THE MARKET AND THE TATE
10-1. THE
10-1.

recorded by the SBO's and ASBO's broadened the source study to laminds earthquakes with messents as small as 1024 upns-on; the small for other traditional first motion solutions or P-says modelling. The inversion procedure was applied to data in the pass band from 30 to 120 ser. The propagation phase for the Love and the Raylaigh wasas was calibrated with signals from two earthquakes for which the source phase was two carthquakes for which the source phase was inferred from the P-says solutions. Agreement with the corresponding P-wave solutions is nearly the same whether or not the smaller eigenralues of the inner product matrix are ruleined in the Jerezione. The double couple of the inner product matrix are ruleined in the Jerezione. The double couple of the total spears, it is not sometimed for more than 24 of the total spears. Bermal faulting along as east to correspondity stripe cheracteries the mechanisms in the pripagal some of alteshock with horizontal compression normal to the arc prevail is the delayed aftershock non-ionated 200 km northwest of the mainshock. Of the surthquakes subjected to this surface wave earlysis the foreshoch atcod out as hering felt a significantly higher apparent atoms, parheps as much see one half an order of magnitude higher than the others. These results suggest that accurate source parameters for modusate to maall magnitude stripulate, scald be routinely determined from surface wass recorded by the SRO's and ASPO's. In particular, the mechanisms of small magnitude foreshoods could be obtained in this way. (Focal Depths, Homent Teneors, Greet Bushe Earthquake). J. Geophya. Ros., Rod. Paper 180426

d970 Structure of crust and upper mantir
SRISMIC AMISOTROFY OSSERVED THE UPPE OCCAMIC CROST
SR. A. Stephen (Woods Enle desamperaphic institution, Woods Enle, NA 02143)
Shimats caloatempy in the upper 1500m, of
occase it hesemens has been observed by polarization essiys of three-component bowshots enismonatur records. The moss rootineing sudents for
the asisotropy is shear was splitting for applosive sources at ierr scionthe. Compressional enveparrials motion deviations suggestirs of emistropy
are also observed but they may be reused by layerell tohomogeneties. The anisotropy was not resoleved by travel-time smalysie. The observed
relotities and particle certons in the borisontal
plame can be endelled to within a stendard deriation by assuming a parfertly classif; borogeneous,
entertopic layer t with hesagonal symmetry and a
harisontal symmetry asis. The cost probable cause
of the anisotropy is praisered crock orientation.
Gaophys. Sea. Lett., Paper 1609th

8978 Structure ot the gruet and upper medile
graucture along the aborthmest edge of
the Shake stues plais is targaparyed from
Sefsaic serractios
L.S. Penkratz (U.S. Geological Burusy, SETSAIC METRACTION
L.A. Penkratz (U.S. Geological Survey,
Genver Facerel Center,
Ocaver, Co., MESSS) S.d. Ackereten
The requite of a select refrestion
aurveg at the ideho Metional ingineering
Laboralorg slong she northwest doundary
of the Sasse Siver Plain cheom that usiocities of the voicenter cooke Benesant the
plain intraces from 1.B kerses at the
eurface to S.2-B.B serses at depthe
outween approximately 2088-5896 estere.
An seploration well in the eres times.
An exploration well in the eres times of
the extens underlink by Teg extern of
2486 meters underlink by Teg extern of
the extens underlink be refrestion data
demonstrate en exploration the second the
term of the present the second times.

Man exploration the eres at the field
of the Lost River engs Youte, or a osidera mell is and homen. The remite
further inclusive that Pelsoacic rocke asy
systems beaeath the plain so yer to 0.8 km
anatheastard from the Arcs Mills.
lesteau refrection. Sinese Sturr Pitini
J. Geophys. Res., Red, Paper 181055

d970 Structure of the crust and upper samile A COMPUTER NODEL STEPT OF THE PROPAGATION of THE ACOMPUTER NODEL STEPT OF THE PROPAGATION OF THE LOSG-RANGE PRIVATE STEPT OF THE PROPAGATION OF THE LOSG-RANGE PRIVATE STEPT OF THE PROPAGATION OF T Geophys. Res. Lett., Paper 1 L0506

d910 Structure of the crust and upper sential A OLRECY MEASUREMENT OF THE OLSTANCE SETWEES A RYPOCEMES 18 A SENIORY-MOAY! ZONE AND THE dLAN-SCHEMESTERS CONTACT LORADY. Stefani (Unpertent of Geophraics, benyord University, dissolord, CA 94305) Indext J. Geifnr and dlang C. Kreeger We unde a direct measurement of the distance feem a hypocement in the Semiety-Medati Lorente the boundary between the downgoing size and overlying sethemosphera. This was screeplished by lying asthemosphers. This was screeniuses of identifying a ion septitude P save reliection off identifying a ion septitude P save reliection of the sist-sethemosphese routent which striage at releaselsair stations several seconds after the iditial P striage. The secured delay time (eYror P) of the reflected phase shows a rendiction assumed well at the solid sequence or receiver effects. The relative sepitude, polarity and delay time of relative sepitude, polarity and delay time of this observed phase are consistent with a model in which the distance between hyporenter and slaberthomosphese contact at this depth is about 38-5 km.

estheousphee contact was as intermediate depth [181 ha] sattranhe in the southern Lucias (181 ha) sattranhe in the southern Lucias which ansured in the lover layer of a double-pland asismic sous. Our assured disfrace, when compared to the district between the ten select souse, indicates that the upper Layer of southers souse, indicates that the upper Layer of southers contact. sphere contast, ,. Geophys. Ros., Sed, Payer Idioli

dSYO Errueture of the rest and appea asstic delights PROPERTIES, SENSITY ARE CONFOSINION OF PRE ICELADS & CRUST FARE SAYDARP (Stone Misses I Confosinion of Confosinion Indicated in General Repartment of Confosinion Confosinion and Confosinion Properties and Confosinion Properties and Confosinion Confosinion and the ways valorises.

Confosinion processes of a their for 13 samples. The assessmentals are from a render assisting of dikan assessmentals are from a render assisting of dikan and alles through the 8th hole. Vrinoffies sud allein the flow insite are refatirely low at the tops, reach maximum values which control for the tops. The first the confosing the first through the state of the confosing the first through the first time if yellow the first time is the confosing the first time assist the process of the other hand, have value that yellow value (called which are appeared within flow assistant value in a assistant value in a assistant value in a second misses appeared within flow

units. Below fife nettra, the dile and these valorities show againstly increase with depth which are related to chinese in mineral-out and independent of perceive. In write it, adding iddfp/dily within the region is well delined by the laboratory vehicities and approximates 0, k m⁻¹, in your approximation field refraction measure-cots. Figh school-lies may the base of the lote are related to increasing afterntion with depth and, in particular, on increase in reddite content, the abundance of epidete in the roots recovered from the loner parties of the drillhole supports a neramorphic origin for the lawer 3-layer I boundary in this region. Carleyle

Solar Physics. Astrophysics, and Astronomy

1799 doier physics, miscalismous
SITEATE 103 in ANTAPCTIC SISM 46 A MARBER sod
solah ACTIVITY
S. J. Jolist IDopartment of Goology, Eniversity
of Kansas, Lawrence, Sanses MGA11 S. C. Sarbor
Firm cores Iron South Pole and Vostok stations
have been analysed for ultrate to determine if
sortations in concentration can be related to
know vertacleos it solar activity. Both analytral records are roughly 1200 years in length and
are based on 1611 isdividual analyses from the
163 m South Pois core set 194 analyses from the
top A7 meters of the Vostok core. Although the
iocalities are separed by 1100 to, there is
substantial stutierity between the records and
the Modero Manimum, Huender Minimum and Medieval
Maximum are present in both curse. Margonic
suntysis of core data and associated snow pit
studies imply a direct connection between salar
sectivity and nitrate concentration in enterrite
firm. 180 as activity, Amarctiva, glaciology,
Loc chemistri. ice chemietrii. Geophys. See. Lett., Paper 110931

Tectonophysics

8130 Bear that
THERMAL COMDUTIVITY AND TEMPERATURE STATESTEE OF
THE PETPORPHIS BOPHHOLE
E. 4. Oburgh (Department of Earth Sciences,
Occuring Street, Carbridge, England) and 1, 0,
Egrell
One bundred and ten measurements of thermal

One bundred and ten measurements of thermal conductivity have been mide on amples over a 1900m depth interval in the Poydarthorder fore-body comprising largely baselity likes and introspec. The coan conductivity of both likes and introspec in reason with depth by adopt 25%, reaching a maximum value of about 1.9 % of 1907. reaching a maximum value of about 1.9 m m⁻¹ M⁻¹. This increase results from the greath of secondary manifals which progressivels full veids with depth and IR web value replace phase hierarchical thermal exhaustivity.

The conductive heat Heat between 1000 and the number as about 1000 m⁻¹. Tellus 6000 the conductive heat Heat apears to be losy than sold the number of the secondary with the secondary value and there are string evidence that as this loght interval the thorizontal apparent of the data of the data of the secondary value. The secondary value is the secondary value of the se

8149 Heat flow the thereford padrotted of Provide following Sulfaceutal Stanta at Continuation, with MMP lightons for continuing the flow 1.0. Nicolassen thereof Provides flow theoponate if the provides of the flow flow design of the flow of the following the flow domain testures of the gooding, in the Plantadop-Carletonoville area in South Africa are a thick sequence of Procambrian estati-fled rocks of the Witwatersami bean and the underlying Archem basedon grante. The underlying Archeso basezent granite. The total crustal thickness is N 16 to and the average measured heat flow is 44 rwn-. At Vredefort, lift, im to the south of the flerkaverage ceasured heat flow is 4A PMPT. At Veedfort, life, in to the south of the tierhedorp-Cerietonville area, Archesh granite loves the core of an updoed and construred sequence of strata. Fecoas guestierist and geological studies provide evidence that the Veedfort bancent grants has also been overtured, exposing a Mit but thick section of the Archean crystalline crust. Profiles across the Veedfort bearent, together with boraholes through the overlying stratalised racks, provide a unique operatually of caseving the contribution of crustal radioactive heat production to surface less flow. Adopting the astrone models for heat production in the lowersont crust, the total contribution to astrone models for heat production in the lowersont crust, the total contribution to surface heat flow from radioactive heat generation in the crust is calculated at between 19 and 16 other 2. Has less flow from the case in the Bouttweetero Trantveal sector of the heapeast cryston is stilled at between 17 and 11 other 3. This less uppercost runtile heat flow is the constitution of the flow provides and doubt that of an oceanic lithosphere is equilibrium. Accordingly, the low flow provides and doubt that of an old oreasic region. The unavailty high earliers of a text flow at the section, and the corresponding low sample heat flow at the decided between the stilled at the section of t

duced best flow is an acceptable approxima-ation heat flow at the base of the stable continental rust, are not apported by the

Big? Ceneral or Histelianrous

FFDTRABILITY AND PRICTICNAL FAOPERFIFE OF SAN

ANDERS FAULY CONCES

C.t. Chu end C.Y. Wang IDeystmens of Geology
and Geophysics, University of California, Berheley. California 941901, and W. Ltn

The permeability of a Ban Andreas fault gauge
is determined under coefficies pressures up to
110 bars; it detreases with pressure from 20

ranciarcy at 15 bars to 0.1 sanodarcy at 720

bars. These values see lower than the values
determined by Norrow es al. 11881. Five different samples of fault gauge with eignificatiity different grain-size distributions were
sheared befores noth joints under confining pressures so determine the alfects of grain stre
and rematituation on the strength of the fault
gauge. The strength of fault gauge tearly depends on its constitution and grain stre distribution, with the rearners souly fault gauge being erronger than the flant claysy gauge. Furthermore, the coarser gauge teeds to arraic barden after yielding, leading to greater strength.
Thus, on the fan and years system varieties
in gauge materials may cause systial varietions
in strength. Using the permeability determined
above, we extinate that the easess porce pressure generated in the featt gouge samples during
the experimental sheav leading may be negligible.
Iferweability, grain size detervibution).
Geophya. Ras. Eett., Paper \$10649

izvestiya Physics of the Solid Earth Volume 16, Number 1

CONTENTS

Molodensky S. M., Kraotor M. V. The influence of large-scole horizontal months inhomogeocities on the earth's tidea

Teylolbaum Yu. M., Ponomarav V. S. The role of weak-carthquake swarme in strong orents prediction Soboleva O. V. Chaogoo in week-earthquoko focal mechonisms due to Nursk stora-

Sonoleva U. V. Lhaogoo in week-cartinquoko local mechonjama due to Nurek storage roservoir

Zobin V. M. Breok-out phese end focal process of the Severe-Kerilak sarthquake,
28 February 1978

Stillor H., Wagner F. K., Volatedt H. Earthquako procursora and pressure dopondecee of clasiic waye velocitica io cracked rocks

Vasilyev Yu. I., Shjorbo M. N., Ivanova L. A., Molotova L. V., Sokolov V. L. Prossure ospaule testing of the horeliclo mothod for stress measurements in a sheck
wave

wave Goldin V. M., Mikhaylov B. O., Mikhaylov V. O. Physicol ospecia of approximation end filtration of anomalous fields
end filtration of anomalous fields
Danilov V. L. Shulman I. I. Application of fluid-dynamic theory of filtration to
two-dimensional growity inversion problems

SCIENTIFIC COMMUNICATIONS

Monakhov P. I., Kissin I. G. Naw svidence for hydrogeodynamic offect prior to sarihquoke occursnce
Ivanov A. P., Barsukov O. M. On outomatic casrch for electric procursors to carthquakeo Zavoyaky V. N. The uoa of romsosot mognetization for dotermining eigenvectors and oignovalues of magnetic anisotropy tensor in rocks

Chernous M. A. Shjorbakov V. P. Pluid-dynamic implications for ocquisition of sedimeotery magnetization

Rikhsylov V. A. Permiskov P. P. The frost penotration problem in a half-infinite

medium with initially licear temperature distribution

product wors, Evraletors profile, but flow,

t. Googhy ., Pess, Rid, Paper 181058

cits Fiste sectonics
aggress of the control of the control of the care liment of the care of columbia Subsective, Salisades, New York 1994; T. P. Aggaradi of the care in care to control of the care of the care in care to care in the c A. Coplan, Fee, Red, Esper Betto

ai50 Plata Teclocide
TME UMORTIBITS OF PINITS HOTATIONS IN
PLATA TROTOSICS

d. J. Selliager (Ouita 7, 247 Unrdea 31.,
Cambridge, Ma. 02138)
Incomplete has violage of the pettern of
magnetic liscalions and foeeth transform
fault represents by eas Yloor opresding data on two plates generated by the
asse oproeding center leads to uncerteinties in a reconstruction of the peof
relative son Yiguration of the plates. A
reconsiruction may be represented by the
finite rotation that describes one configuration tellitye to enother. In this
paper a method of rerocotruction in proulded that refyriele the uncertainties in
the data. The melnoi michieses a setypted inset-equareo memoure of fit as e
function of the rotation germaetere. For
a given rolation the mesoure of the
weighted distances of fleed and votated
data points (representing corresponding
Yormer plate sergin. The toxion margin
is entimated Yoro the locations of totaliesed end rotated data points. The sotmated cargin conclusts of a corticle wree. It is shown now the method
of reconstruction as the characterise
the timite ritation. These termingers
are than uncertainty region for the join
and angle of rotation that characteriae
the timite ritation. These termingers
are than used to study the maser-antity
are than used to study the maser-antity
are than used to study the maser-antity
are the times of anotalies is and its.
The cest-Fit reconstructions and the uncertainty region for the anotally is pole ler the times of anomalise i) and it.
The test-yit recunstructions and the uncertainty region for the anomaly id pole
are in good agreement with privious work.
However, the uncertainties in the anomai, i) pole were substantially undercutminimum in the contraction of the co